Marketing and Consumer Perceptions of Sugar-Containing Beverages Positioned as Healthy or as Having Health-Related Benefits

Aimee Lee Brownbill

BHlthSc (Hons)

School of Public Health

Faculty of Health & Medical Sciences

The University of Adelaide

Thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

July 2020

Contents

Research output from this thesis

Publications

1. Brownbill AL, Miller CL, Braunack-Mayer AJ. Industry use of 'better-for-you' features on labels of sugar-containing beverages. Public Health Nutr. 2018;21(18):3335-43. doi:10.1017/S1368980018002392
   ***Note: 6 citations (Google Scholar) and Altmetric Attention Score of 55 (top 5% of Altmetric Attention Scores worldwide), accessed on 15 July 2020.*

2. Brownbill AL, Braunack-Mayer AJ, Miller CL. Health Star Ratings: What's on the labels of Australian beverages? Health Promot J Austr. 2019;30(1):114-18. doi:10.1002/hpja.197
   ***Note: 5 citations (Google Scholar) and Altmetric Attention Score of 30 (top 5% of Altmetric Attention Scores worldwide), accessed on 15 July 2020.*

3. Brownbill AL, Miller CL, Smithers LG, Braunack-Mayer AJ. Selling function: The advertising of sugar-containing beverages on Australian television. Health Promot Int. 2020; daaa052. doi:10.1093/heapro/daaa052

4. Brownbill AL, Braunack-Mayer A, Miller C. What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness. Appetite. 2020;150:104675. doi:10.1016/j.appet.2020.104675

Citation of publications in national policy documents

1. MPconsulting. Five year review of the Health Star Rating System - consultation paper: options for system enhancement. 2018 Oct.

2. MP Consulting. Draft Health Star Rating System Five Year Review Report. 2019 Feb.

3. MP Consulting. Health Star Rating System Five Year Review Report. 2019 May.
4. Food Regulation Standing Committee. Policy paper: labelling of sugars on packaged foods and drinks. 2019 June.

5. Food Regulation Standing Committee. The Australia and New Zealand Ministerial Forum on Food Regulation response to the Health Star Rating System five year review. 2019 December.

Conference presentations

1. Brownbill AL, Braunack-Mayer AJ, Miller CL. Analysis of sugary beverages marketed as healthy via product labels in South Australian stores. 15th World Congress on Public Health; Melbourne, Australia: 2017 (Oral presentation).
2. Brownbill AL, Braunack-Mayer AJ, Miller CL. The positioning of sugary beverages as better for you via product labels in South Australian stores. Australian New Zealand Obesity Society Annual Scientific Meeting; Adelaide, Australia: 2017 (Oral presentation).
3. Brownbill AL, Braunack-Mayer AJ, Miller CL. The positioning of sugary beverages as better for you via product labels in South Australian stores. South Australian Population Health Conference; Adelaide, Australia: 2017 (Oral presentation).
4. Brownbill AL, Miller CL, Braunack-Mayer AJ. FSANZ Claims and Health Star Ratings: A label audit of ready-to-drink sugary beverages. Australian New Zealand Obesity Society Annual Scientific Meeting; Adelaide, Australia: 2017 (Poster presentation).
5. Brownbill AL, Miller CL, Braunack-Mayer AJ. FSANZ Claims and Health Star Ratings: A label audit of ready-to-drink sugary beverages. South Australian Population Health Conference; Adelaide, Australia: 2017 (Poster presentation).
6. Brownbill AL, Miller CL, Braunack-Mayer AJ. FSANZ Claims and Health Star Ratings: A label audit of ready-to-drink sugary beverages. South Australian Health and Medical Research Institute Annual Scientific Meeting; Adelaide, Australia: 2017 (Poster presentation).
7. Brownbill AL, Miller CL, Braunack-Mayer AJ. FSANZ Claims and Health Star Ratings: A label audit of ready-to-drink sugary beverages. Florey International Postgraduate Research Conference; Adelaide, Australia: 2017 (Poster presentation).

8. Brownbill AL, Braunack-Mayer AJ, Miller CL. How sugary beverages are positioned as better-for-you through their labels. 25th European Congress on Obesity; Vienna, Austria: 2018 (Oral presentation).

9. Brownbill AL, Miller CL, Smithers LG, Braunack-Mayer AJ. Sugar coating beverages: How television advertisements position sugar-sweetened beverages as healthy. 25th European Congress on Obesity; Vienna, Austria: 2018 (Poster presentation).

10. Brownbill AL, Miller CL, Smithers LG, Braunack-Mayer AJ. Sugar coating beverages: How television advertisements position sugar-sweetened beverages as healthy. Australian Public Health Conference; Cairns, Australia: 2018 (Poster presentation).

11. Brownbill AL, Miller CL, Smithers LG, Braunack-Mayer AJ. Sugar coating beverages: How television advertisements position sugar-sweetened beverages as healthy. South Australian Health and Medical Research Institute Annual Scientific Meeting; Adelaide, Australia: 2018 (Poster presentation).

12. Brownbill AL, Miller CL, Braunack-Mayer AJ. FSANZ Claims and Health Star Ratings: A label audit of ready-to-drink sugary beverages. South Australian Cardiovascular Research Showcase; Adelaide, Australia: 2018 (Poster presentation).

13. Brownbill AL. Energy drinks in Australia - the state of play. In: Caffeinated energy drinks workshop, facilitated by Lund-Iversen K. Food Governance Conference; Sydney, Australia: 2019 (Invited workshop presentation).

Awards received

1. Higher Degree by Research 2019 Publication Prize, awarded by the School of Public Health at The University of Adelaide (2019).

2. Population Health Poster Prize, awarded by the Heart Foundation and South Australian Health and Medical Research Institute at the South Australian Cardiovascular Research Showcase (2018).

3. Best Health Promotion Presentation Award, awarded by the Australian Health Promotion Association at the South Australian Population Health Conference (2017).

Media coverage

1. Black E. Health-star ratings on drinks is flawed, misleading consumers, research finds. The Advertiser [Online news]. 2018 Sep 20. Available from: https://www.adelaidenow.com.au/lifestyle/food/healthstar-ratings-on-drinks-is-flawed-misleading-consumers-research-finds/news-story/2934be3e977178704579bdf64e6e8c76

2. Hickey A. FIVEaa: Adelaide [Talk-back radio interview]. 2018 Sep 20.

3. Holland G. 2GB Sydney [Radio news]. 2018 Sep 20.

4. NA. ABC Adelaide [Radio news]. 2018 Sep 20.

5. Black E. Health-star ratings on drinks is flawed, misleading consumers, research finds. West Australian [Print news]. 2018 Sep 20.

6. Black E. Five-star ratings' sour taste. The Advertiser: Adelaide [Print news]. 2018 Sep 20.

7. Swannell C. Improving the power of Health Star Ratings. MJA InSight [Online]. 2018 Sep 24. Available from: https://insightplus.mja.com.au/2018/37/research-news-in-brief-74/

8. Noone Y. The truth about the sugar content of 'no added sugar' smoothies. Special Broadcasting Service [Online news]. 2018 Sep 24. Available from: https://www.sbs.com.au/food/article/2018/09/24/truth-about-sugar-content-no-added-sugar-smoothies

9. Nell R. The Australian Science Channel, The Royal Institute of Australia [Online]. 2018 October 4. Available from: https://twitter.com/RiAus/status/1048043730513608704

10. Schiller J. ABC Radio Adelaide, Drive [Talk-back radio]. 2018 Oct 10.

11. Wakelin J. Nine News Adelaide [TV news]. 2018 Oct 10. Available from: https://twitter.com/9NewsAdel/status/1050188091879649280

12. NA. Sweet drink labels leave a sour taste. Mirage News [Online news]. 2018 Oct 11. Available from: https://www.miragenews.com/sweet-drink-labels-leave-a-sour-taste/

13. Neo P. Several shortcomings or a solid start? Academics and industry disagree over Health Star Rating for Aussie beverages. Food Navigator-Asia [Online]. 2018 Oct 16. Available from: https://www.foodnavigator-asia.com/Article/2018/10/16/Several-shortcomings-or-a-solid-start-Academics-and-industry-disagree-over-Health-Star-Rating-for-Aussie-beverages

14. Howe C. ABC South East SA: Adelaide [Talk-back radio]. 2018 Oct 18.

15. Logan L. How healthy are these drinks?. University of Adelaide [Instagram interview]. 2018 Oct 31.

16. Whitehead R. Australians have growing appetite for sweet drinks. Beverage Daily [Online]. 2019 July 10. Available from: https://www.beveragedaily.com/Article/2019/07/10/Australians-have-a-growing-appetite-for-sweet-drinks-reform

17. Neo P. Star crazy: Aussie health rating changes could see confectionary achieving 'good for you' status. ConfectionaryNews [Online]. 2019 Nov 5. Available from: https://www.confectionerynews.com/Article/2019/11/05/Star-crazy-Aussie-health-rating-changes-could-see-confectionery-achieving-good-for-you-status

Abstract

Reducing population consumption of sugar-containing beverages is widely acknowledged as an important public health measure to address high population prevalence of overweight and obesity and related non-communicable diseases. In this thesis, I address marketing as a key driver of consumption and explore how advertising may function to negate increasing consumer concerns about sugar in beverages. My specific aims were to investigate how sugar-containing beverages are being marketed as healthy, or as having health-related benefits, and, how health-related marketing influences consumers' perceptions of the healthfulness of these beverages.

In study one, I conducted a cross-sectional audit of sugar-containing beverages sold in 17 Australian supermarkets during 2016. I analysed the content of 945 sugar-containing beverage labels to assess the extent and nature of explicit and implicit features that positioned them as healthy or better-for-you. I found that 88% of labels displayed advertising that positioned the beverage as healthy or better-for-you. Certain types of beverages were strongly positioned in this way. I also examined the use of the Health Star Rating System, a government-endorsed front-of-pack labelling scheme, in a sub-set analysis of 762 ready-to-drink sized beverages. I found that in its voluntary nature the system was preferentially displayed on high sugar products that scored a healthy rating, namely juices. In this way the system functioned more as tool for advertising juices than a comprehensive tool for informing consumers.

In study two, I further explored the positioning of sugar-containing beverages as healthy or better-for-you in television advertisements. All advertisements on free-to-air television from one Australian major network were collected during 2016. I qualitatively analysed 37 unique advertisements from beverage manufacturers to examine health-related messaging in sugar-containing beverage television advertisements. I observed that beverages were positioned as contributing a functional role to promote and enhance physical, mental and social health and wellbeing. In this way, advertisements were situated in wider understandings and conceptualisations of health.

In study three, I explored how young adults conceptualise the healthfulness of sugar-containing beverages. I conducted seven semi-structured focus groups with South

Australians aged 18 to 25 years (n=32) to elicit information on perceptions regarding beverage healthfulness and how participants evaluated whether a beverage was healthy, or healthier than others. I found that conceptualisation of beverage healthfulness was a balancing act in which participants weighed up their perceptions of beverage ingredients and properties that they saw to be harmful to health, necessary for health, and beneficial to health. In beverages that are positioned as healthy, ingredients and properties perceived as health-promoting appeared to outweigh concern for sugar content.

The studies provide insight into how sugar-containing beverages are being advertised within the current sugar-conscious era and how this positioning aligns with consumers' understanding of health-promoting products. This body of work highlights the gaps in current advertising regulations that allow beverages high in sugar to be positioned as healthy or as having health-related benefits and makes recommendations for strengthening these regulations. Further, this body of work can be used to inform public health interventions which seek to counter misperceptions of beverage healthfulness.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

I acknowledge that copyright of published works contained within this thesis resides with the copyright holder(s) of those works.

I also give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library Search and also through web search engines, unless permission has been granted by the University to restrict access for a period of time.

I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship and Ian Wilson Liberal Supplementary Scholarship.

Aimee Lee Brownbill

21 April 2020

Acknowledgements

First and foremost, thank you to my supervisors Professor Caroline Miller and Professor Annette Braunack-Mayer. Without your support, advice and feedback this thesis would not exist.

I would not have been able to undertake this degree without receiving the Australian Government Research Training Program Scholarship; the Ian Wilson Liberal Research Supplementary Scholarship also lessened the financial burden on me and for this I am extremely grateful. I am also thankful for the funding and in-kind support I received from The University of Adelaide School of Public Health and the South Australian Health and Medical Research Institute (SAHMRI) Health Policy Centre which enabled me to conduct this research and present my findings at scientific conferences.

A tremendous thank you to the members of the SAHMRI Health Policy Centre. I am forever grateful for the continual support and encouragement you have all shown me over the years I have worked with you. A special thank you to Joanne Dono, for always making time to provide me with guidance and help when I needed it and for regularly checking up on me.

Many others have also provided me with input and practical support. Thank you, Associate Professor Lisa Smithers, Joanne Dono, Katrina Douglas, Dr Kerry Ettridge, Associate Professor Jaklin Eliott and Dr Adyya Gupta. To the individuals who reviewed the manuscripts within this thesis for publication, thank you for your time and input; your suggestions ultimately led to better papers. To the individuals who participated in my focus groups, thank you for your time and input—my last study could not have been done without you.

Finally, thank you to my friends and family who provided the emotional support required to endure the PhD journey. To my partner Michael, thank you for being openly proud of my achievements and for continually sharing your belief in me. Your love for me and support in my endeavours is endless and for that I thank you.

Contextual statement and thesis outline

Overweight, obesity and related non-communicable diseases (NCDs) are a wicked problem affecting the public's health globally. They are complex issues, influenced by a diverse range of factors, and inevitably require multiple approaches to address the problem. One of the many approaches which is widely recognised by public health professionals and organisations to tackle the problem is to reduce the consumption of sugar-sweetened beverages. Frequent consumption of sugar-sweetened beverages is also associated with metabolic and health risks such as type II diabetes, cardiovascular risk factors and tooth decay, independent of overweight and obesity.

This thesis addresses marketing as a driver of high population sugar-containing beverage consumption. The research has been designed to address a gap in knowledge regarding health-related marketing of sugar-containing beverages in Australia within the context of the current sugar-conscious era. The overarching aim of the thesis was to examine how sugar-containing beverages are being marketed as healthy, or as having health-related benefits, and how this marketing might influence consumers' perceptions of these beverages.

Throughout this thesis, the terms 'sugar-sweetened beverages' and 'sugar-containing beverages' are both used. I have specifically used sugar-sweetened beverages when referring to health-related literature on this topic so not to mischaracterise previous research findings. However, I refer to 'sugar-containing beverages' for the overarching body of research this thesis comprises, to acknowledge the slightly wider scope that this thesis addresses beyond that commonly defined in previous research (namely, the inclusion of juices). This is defined and justified in Chapter 3.

This thesis is presented by publication and comprises seven chapters. Chapter 1 is introductory, and I outline the background and context in which this research project is situated. In Chapter 2, I present a review of the literature regarding the specific research topic, identifying the gaps of current research. I then describe the research methodology I have employed in Chapter 3, providing justification for the research approach and methods selected. Chapters 4-6 are the empirical chapters of the thesis where I present the three studies I conducted. These three chapters are presented as four published peer-reviewed journal articles. Published manuscripts can be viewed in Appendix A-D. In Chapter 7, I

conclude the thesis by summarising the research project as a whole and discussing the research implications for research, policy and practice. To aid with readability, I have numbered tables and figures consecutively in the thesis according to their chapter number (e.g. Table 2.1 pertains to table 1 in chapter 2).

Chapter 1: Introduction

1.1 Chapter outline

In this chapter, I provide an overview of the background that informs and justifies my research project. I begin by contextualising the public health impact of obesity and related NCDs. I describe the role that sugar-sweetened beverages play in contributing to the development of obesity and related NCDs. I then present marketing as a dominant factor that contributes to consumption of sugar-sweetened beverages, and then discuss the current social context of increased awareness and concern about the health effects of sugar-sweetened beverages and how marketers may be addressing this. I conclude the chapter by describing the topic of this research project. The following chapter (Chapter 2) provides a more detailed review of the literature regarding the research aim.

1.2 Introductory background

Overweight, obesity and NCDs in Australia

Overweight, obesity and related NCDs are a global public health issue.[1] The rate of global obesity has almost tripled since 1975 with more than 1.9 billion adults overweight in 2016, 650 million of whom were obese.[2] In Australia, the rate of obesity is higher than other countries within the OECD (Organisation for Economic Co-operation and Development), with 27.9% of Australians aged 15 years and above experiencing obesity in 2015 compared to the OECD average of 19.4%.[3] The prevalence of overweight and obesity also continues to rise in Australian adults, with two-thirds of adults (67%) experiencing overweight or obesity in 2017-18, increasing 3.6% since 2015.[4] Although stable over the past decade, Australian children continue to experience a high rate of overweight and obesity, with a quarter of children aged 5-17 years reported as overweight or obese in 2017-18.[4] The Australian Institute of Health and Welfare (AIHW) have raised particular concern regarding the increase of Australian adults experiencing severe obesity (class II and III obesity) from 4.9% in 1995 to 9.4% in 2014-15.[3]

Overweight and obesity contribute to the development of NCDs such as type II diabetes, cardiovascular disease and cancer.[2, 5] In 2015, overweight and obesity contributed to 8.4% of the total Australian burden of disease, second only to tobacco as the leading contributor

(9.4%) and closely followed by dietary risk (7.3%).[6] When considering non-fatal burden of disease, overweight and obesity was the leading contributor.[6] When considering disease-specific burdens in Australia, overweight and obesity contributed 54% of the burden from diabetes, 44% of osteoarthritis, 40% of chronic kidney disease, 25% of coronary heart disease, 24% of asthma and 21% of stroke burden in 2015.[6] Further, overweight and obesity contributed 7.8% of the burden of disease from cancer in 2015.[6] The AIHW estimated that, over the 9 year period from 2011 until 2020, an approximated 14% of the burden of disease attributable to overweight and obesity could be prevented if the BMI of each individual at risk in 2011 were to be reduced by 1 point (approximately 3kg on average) and maintained until 2020.[5]

Overweight, obesity and NCDs place a tremendous burden, not only on the individual, but also on the economy. In 2008, the overall cost of obesity in Australia (not including overweight) was $52 billion.[7] It was estimated in 2015 that inaction on the prevention of further increases to the prevalence of obesity would cost Australia an additional $87.7 billion (direct and indirect costs) over the 10-year period until 2025.[8] It was further estimated that, if Australia were to meet the World Health Organization (WHO) goal for reducing and maintaining obesity prevalence to that of 2010[9] (an approximated 26% of the Australian population), Australia would save $10.3 billion in obesity-related costs over the 10 year period.[8] However, Australia could save $2.1 billion over the 10-year period if a $1.3 billion investment in intervention and prevention measures were implemented to address obesity (a benefit ratio of 1.7).[8] Of these savings, 76% would be savings to the Australian Government.[8] Unless adequate preventable measures are implemented, the cost of overweight and obesity, and the consequential rise in NCDs, will only continue to increase and will be exacerbated in Australia by the ageing population.[10]

Overweight, obesity and related NCDs are complex and develop in response to a variety of risk factors.[11] These risk factors span the micro to macro determinants of health with individual factors such as genetics and lifestyle at one end of the scale, and global factors such as globalisation and urbanisation at the other.[12] While globalisation has led to enormous improvements in food security and quality of life, it has also led to changes in the food environment that act as a key driver of population weight gain and the development of obesity and related NCDs.[12, 13] The current food environment is largely one of increased food

availability, lower food prices and abundant food marketing, particularly for non-core (energy-dense and nutrient-poor) food and beverages.[12, 13] This change in food environment has led to a population 'nutrition transition' through which diets that were once rich in whole foods such as vegetables, legumes and coarse grains have been replaced by diets high in refined carbohydrate, free sugar, saturated fat and animal products.[11, 12] The increased consumption of energy-dense and nutrient-poor foods promote unnecessary energy intake which, when combined with the increasingly sedentary lifestyle, results in energy imbalance and subsequent weight gain.[11, 12] The increased use of sugar to sweeten food and beverages has been specifically noted as playing a large role in contributing to the development of overweight, obesity and the risk of developing NCDs.[14]

Strong evidence associating high intake of free sugars with weight gain and risk of NCDs has led health organisations to recommend reduced intake globally.[14] The WHO define free sugars as "monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates".[14] In 2015, the WHO released a guideline for free sugar intake which strongly recommended a reduction of free sugar intake to less than 10% of total energy intake, with further suggestions recommending reduced intake to below 5%.[14]

Results from the 2011-2012 Australian Health Survey found that Australians consumed an average of 60 grams of free sugars daily, with intake highest among adolescent males (aged 14 to 18 years) who consumed an average of 92 grams daily.[15] When considering the WHO recommendations, half of all Australians (52%) were found to exceed the recommendation for consuming less than 10% of free sugar and almost all (98%) exceeded the less than 5% recommendation.[15] Children and adolescents were most likely to exceed the WHO recommendations.[15]

Beverages were the leading source of free sugar in the Australian diet, contributing to 52% of free sugar intake.[15] Similarly, beverages have been identified as significantly contributing to free sugar intake in other Australian population studies[16-18] and globally.[14] Sugar-sweetened beverages (SSBs) have been identified as a source through which high free sugar consumption, which can contribute to the development of obesity, can be addressed on a population level.[19]

Contribution of sugar-sweetened beverages to weight gain, obesity and related NCDs

Globally, SSB consumption is high.[11, 14, 20-25] While the definition of SSBs differs slightly between researcher publications and health organisations, in Australia, SSBs are most commonly defined as 'all non-alcoholic water based beverages with added sugar, such as non-diet soft drinks, energy drinks, fruit drinks, sports drinks and cordial.'[26] Over a third of Australian adults (36%) consume SSBs on a weekly basis and 9% on a daily basis according to data collected in the 2017-18 National Health Survey.[4] This Survey further found that SSB consumption is highest among young adults aged 18-24 years, with 61% consuming SSBs weekly and 13.6% consuming SSBs daily.[4] Research has consistently shown consumption to be highest among young adults and adolescents, both in Australia[27-30] and internationally.[31-35]

Frequent SSB consumption is a known risk factor for the development of weight gain, obesity and NCDs. Research has found SSBs to be linked with increased weight gain and obesity in both adults and children,[27, 28, 36-46] and in the development of NCDs such as type II diabetes,[37, 45, 47, 48] metabolic syndrome,[49] and dental caries.[50, 51] Research has also indicated that frequent SSB consumption is a risk factor in the development of cardiovascular disease.[52-54] Given the contribution SSBs make to overweight, obesity and related NCDs, reducing population consumption is one way to help address these population health problems.[55, 56]

Marketing as a driver of sugar-sweetened beverage consumption

The marketing of SSBs is ubiquitous: SSBs are marketed via multiple mediums[57-66] and in diverse environments such as in schools[67-70] and throughout transport networks.[71, 72] As a result, exposure to SSB marketing, particularly among young people, is frequent and persistent.[57, 66, 73-77] Marketing is a well-known influence on consumer behaviour,[12, 13, 78] and there is strong evidence supporting an association between exposure to food marketing and increased consumption of and preference for marketed products.[79-83] This has similarly been demonstrated regarding the marketing of SSBs, with frequent exposure shown to result in increased selection,[77, 84, 85] initiation of consumption,[84, 86] and overall consumption of SSBs,[74, 77, 87-92] as well as enhanced attitudes towards marketed SSBs.[66, 90]

The objective of marketing is to create new consumers or encourage existing consumers to purchase more. Given that frequent consumption of SSBs leads to adverse health outcomes, the ubiquitous marketing of SSBs can be considered a contributor to an obesogenic environment that promotes overweight, obesity and related NCDs.[11, 93] Strong regulation of unhealthy food and beverage marketing is consistently suggested by leading health organisations and the public health community as an important measure to address overweight, obesity and related NCDs at a population level.[9, 12, 94-99] Reducing the marketing of SSBs has also been identified as a national key priority for action on obesity prevention in Australia.[99]

To develop effective interventions and policies that reduce the health impact of SSB marketing, an understanding of how SSBs are currently marketed is necessary. The marketing matrix, first described by McCarthy,[100] can provide a useful overarching framework for understanding the ways in which products are marketed. McCarthy[100] presents product, place, promotion and price as the overarching framework in which marketing occurs. *Product* refers to the item being sold, that is, the sugar-sweetened beverage, and the package that it is sold in, and is developed to satisfy consumers' wants and needs. *Place* refers to the locations in which the item is sold. *Promotion* refers to all means of communication used to inform consumers about the product and spread messages about the product's attributes and benefits. Promotion can also add psychological values to the product to meet consumer demands.[100] *Price* is also used to market products. External factors also impact marketing and, to be successful in its objectives, marketing must adapt accordingly. These external factors include the political, legal, cultural, and social environment in which marketing occurs.[100]

The context in which SSBs are currently marketed

Market research has shown consumers are becoming increasingly concerned about sugar intake, both in Australia[101] and internationally.[102, 103] This is unsurprising given increasing uptake of public health policies and interventions addressing SSB consumption. For example, in 2019, over 40 countries had some form of taxation on SSBs.[104] Many cities have also delivered social marketing campaigns on SSBs, such as the 'Rethink Sugary Drink' campaign delivered in Australia since 2013,[105] and a number of these campaigns are also delivered to a

wider audience via social media.[106] Discussion and implementation of policies and interventions addressing SSB consumption have garnered media coverage which has also drawn attention to the harms associated with frequent SSB consumption;[107, 108] sugar has been particularly framed as a harmful ingredient in beverages.[109]

A 2016 market research report on the beverage industry in Australia noted that consumer concern of the health effects of sugar consumption is one of the largest threats faced by the beverage industry.[110] This was demonstrated in sale performance of beverages in 2015, with beverages perceived as being high in sugar, such as soft drinks (or 'soda'), experiencing a lower growth in the volume of sales during 2015, while beverages perceived as healthy or nutritious, such as iced teas, experiencing larger growth in sales.[110] The report forecasted that there would be a continued growth in the marketing of beverages that are perceived as better for health.[110] The 2019 edition of this report indicated these trends have continued and are likely to continue in subsequent years.[111]

Health-related marketing

Health-related marketing of food is not a new technique. Manufacturers often use health and nutrition content claims on food products, particularly non-core foods.[59, 112-129] Health and nutrition claims have been shown to increase consumer perceptions of product healthfulness[130-134] and purchasing and consumption of food.[123, 134-137] Research has shown nutrition claims are used by consumers to justify food choices which are otherwise perceived as unhealthy, with consumers' attention focusing almost exclusively on added nutrients rather than unhealthy ingredients.[138] This can lead to reduced guilt associated with consuming unhealthy foods and overconsumption.[139] This is particularly problematic when consumers use unhealthy foods, marketed as healthy or having health-related benefits, to supplement an already unhealthy diet.[138]

Unhealthy food and beverage products continue to display health and nutrition claims to market their products as healthy despite regulation to prevent this. In Australia, health and nutrition claims are regulated by the Food Standards Australia New Zealand Code on nutrition, health and related claims,[140] hereafter referred to as the FSANZ Code. The FSANZ Code aims to prevent misleading and un-substantiated health and nutrition content claims from being made by manufacturers on food labels or in advertising.[140] As regulated by the

FSANZ Code, health claims refer to specific food-health relationships and nutrition content claims state the presence or absence of nutrients.[140] Pulker et al.[141] found that almost a quarter (23%) of food and beverages displaying general-level health claims on their package were using inaccurate or inappropriate claims in Australia during 2015, and the majority of products (82%) that displayed nutrition content claims were using inaccurate or inappropriate claims. Previous research has shown that health and nutrition claims are not well understood by consumers[142] and that consumers often do not differentiate between nutrition and health claims.[132, 143, 144]

In addition to explicit health and nutrition claims, previous research has found that it is also common for implicit health-related messaging to be used in the marketing of non-core foods, for example, by associating food products with general well-being, physical activity, and naturalness.[112, 118-121, 125, 128] The use of implicit health-related messaging can similarly lead consumers to believe products are healthier.[138, 145-150] Previous research has found that simply changing the name of 'candy chews' to 'fruit chews',[149] 'sugar' to 'fruit sugar',[151] 'Zing bar' to 'Zing protein bar',[147] and 'soda' to 'vita-soda'[150] can influence perceptions of product healthfulness. Previous research has also indicated that implicit health- and nutrition-related claims, and general perceived healthfulness of a product, can lead to stronger product preferences than explicit health and nutrition claims.[137, 152, 153]

In summary, health-related marketing can influence purchasing and consumption behaviour and this marketing is common for non-core foods. However, limited research has explored health-related marketing of sugar-containing beverages and the influence of this marketing on consumer perceptions and behaviours. A detailed review of this research is provided in Chapter 2. The aim of this thesis was to investigate how sugar-containing beverages are being marketed as healthy, or as having health-related benefits, and how this marketing might influence consumers' perceptions of these beverages. This thesis builds on the existing literature by focusing on current health-related marketing of sugar-containing beverages in Australia during the current sugar-conscious era and the influence this may have on consumers. An understanding of how sugar-containing beverages are currently marketed can help inform public health interventions and policies that aim to reduce consumption of sugar-containing beverage. Such interventions and policies are one way to help reduce overweight, obesity and related NCDs.

1.3 Research aims and questions

The thesis aims are to investigate:

1. How sugar-containing beverages are marketed as healthy, or as having health-related benefits; and,
2. How health-related marketing influences consumers' perceptions of the healthfulness of sugar-containing beverages.

The specific research questions to address these aims are:

1. How are sugar-containing beverages currently marketed as healthy via their product labelling?
2. What messaging is presented in television advertisements of sugar-containing beverages that associates these products with health?
3. How do Australian young adults aged between 18 and 25 years conceptualise what makes a beverage healthy, or healthier?

Chapter 2: Literature review

2.1 Chapter outline

In this chapter, I review existing literature on the health-related marketing and consumer perceptions of sugar-containing beverages. My initial intention for this chapter was to discuss research that examines the specific influence of health-related marketing of sugar-containing beverages on consumer perceptions and behaviour; however only one study was identified that does this.[154] The identified study, an online survey with US parents, found that at least a third of participants indicated that each of five health-related claims presented to them (low-calorie, real/natural, vitamin C, antioxidants, low-sodium) were important in their decision to purchase sugar-containing beverages for their children.[154] To provide a more in-depth discussion of the existing literature beyond this single study, I focus in this review on three topics: (i) health-related marketing of sugar-containing beverages; (ii) consumer perceptions regarding the healthfulness of sugar-containing beverages; and (iii) influence of perceived sugar-containing beverage healthfulness on consumption. I begin each section by characterising the research that has previously been conducted and then present a synthesis of relevant information from previous research. Through this review, I identify gaps in current research and how my research seeks to address these gaps in knowledge.

2.2 Health-related marketing of sugar-containing beverages

Research examining health-related marketing of sugar-containing beverages is scarce. A small body of literature exists that addresses health-related marketing of food and beverages.[59, 112, 115, 116, 120, 125, 129, 155, 156] However, such research captures beverages within a wider sample (i.e. food *and* beverages), and beverages are typically presented as an overarching category. Further, some studies also combine their analysis of fruit juice with whole fruit, rather than categorising fruit juice with other beverages or separately.[112, 116, 155] Research taking a sole focus on the beverage market is limited[157-160] and few studies specifically aim to address health-related marketing of sugar-containing beverages;[159, 160] none of this research analyses the Australian market. Most existing research examines health-related marketing through product labels,[112-117, 155-160] including all beverage-specific research, and some does so through television advertisements.[59, 120, 125, 129]

Despite limited research, it is evident that health-related marketing of sugar-containing beverages is common, and a range of techniques are used to position sugar-containing beverages as healthy in marketing. Studies investigating both food and beverages show that sugar-containing beverages are among the top product category using health-related marketing,[112, 113, 117, 120] with health-related marketing common on both sugar-containing beverage labels and within television advertisements.[114, 115, 120, 129, 155] Several studies measure health claims (i.e. food-health relationships) and/or nutrition content claims (i.e. presence or absence of nutrients) in marketing; health and nutrition content claims are commonly regulated in many countries.[114-117, 129, 156] Other studies measure both health and nutrition content claims, as well as other health-related marketing techniques (e.g. associating products with physical activity or fruit consumption) which are defined more broadly than what is commonly captured in regulation of health and nutrition content claims.[59, 112, 113, 120, 125, 155, 157-160] Diverse measures are used across existing research to capture these other forms of health-related marketing of sugar-containing beverages. When synthesised, previously identified health-related marketing techniques of sugar-containing beverages can be summarised as follows: positive nutrient content claims,[113-115, 117, 129, 157, 158, 160] low-in negative nutrient content claims,[113-117, 129, 155-158] health or nutrition benefit claims,[59, 114, 115, 129, 157-159] functional claims,[120, 160] physical activity and sport positioning,[59, 158, 159] natural positioning,[157-159] feel good positioning,[125, 158] social positioning,[125] health endorsements,[159] daily guideline amounts,[158] and images of fruit.[158, 159]

Some studies provide further analysis of 'nutrition-related claims' across select beverage categories.[117, 157, 158] Although what has been captured as 'nutrition-related claims' and the beverage categories observed vary between these studies, they provide some insight into this form of health-related marketing across beverage categories. Within these studies, 'nutrition-related claims' were observed on all flavoured waters,[157] 80-97% of sports drinks,[117, 157, 158] 95% of iced teas,[157] 62-88% of fruit flavoured drinks,[157, 158] 56-76% of juices,[117, 158] and 22-84% of soft drinks.[117, 157, 158] This research suggests that health-related marketing occurs across sugar-containing beverage categories but that it is likely to be more common within certain beverage categories.

2.3 Consumer perceptions regarding the healthfulness of sugar-containing beverages

There is a body of literature that address attitudes, perceptions and consumption of sugar-containing beverages. At the commencement of this research project, little of this research presented information regarding perceptions of beverage healthfulness,[66, 74, 84, 88, 154, 161-171] with many studies informing the topic published after mid-2016.[58, 73, 77, 87, 89, 172-188] A large subset of research is dedicated to attitudes and perceptions regarding energy drinks,[58, 66, 73, 77, 87, 89, 163, 165, 168, 174-176, 178-181, 183, 187] particularly among adolescents and young adults, and a considerable amount addresses sugar-containing beverages in general,[74, 84, 88, 154, 161, 162, 166, 167, 169-172, 177, 182, 184, 185, 188] spanning several population sub-groups. Less research focuses on other beverage categories, with some studies exploring perceptions of sports drinks among children and adults.[164, 173, 186] Much of the research has been conducted internationally,[58, 73, 74, 77, 84, 87, 154, 161-163, 165-181, 183, 184, 186, 188] with few studies conducted in Australia.[66, 88, 89, 177, 185, 187] Little existing research specifically aims to address perceptions of beverage healthfulness.[154, 162, 167, 177, 182] With the exception of one cross-country analysis of adult ratings of beverage healthfulness, which includes a sample from one Australian city,[177] existing research that specifically aims to address perceptions of beverage healthfulness has been conducted internationally with adult, parent and child samples.

Research suggests that modern sugar-containing beverages are perceived as healthier alternatives to traditional soft drinks. Some existing research has specifically assessed participant ratings of beverage healthfulness across different beverage categories, measured as either mean perceived healthfulness or percentage rated as healthy.[74, 154, 162, 167, 177, 182] Table 2.1 compares the results of these studies, ordering beverage categories from what were most commonly rated across studies as the least healthy (or lowest percentage rated as healthy) to what were most commonly rated as the healthiest across studies (or highest percentage rated as healthy), and assesses agreement between studies regarding this gradient of perceived healthfulness. While the beverage categories measured and the reporting of perceived healthfulness vary, a similar gradient of perceived beverage healthfulness between beverage categories is evident. Across these studies, energy drinks and soft drinks (both sugar-sweetened and non-caloric) are commonly rated as the least healthy, with these beverage categories interchanging in their positioning as least healthy,

while other beverages are commonly rated as healthier (i.e. iced teas, sports drinks, fruit flavoured drinks, fruit flavoured waters and juices) and water is commonly rated as the healthiest (Table 2.1).[74, 154, 162, 167, 177, 182]

Additional research similarly indicates that consumers commonly view soft drinks and energy drinks as unhealthy,[84, 161, 168, 172] and non-caloric soft drinks as the same as,[161, 189] or less healthy than, sugar-sweetened soft drinks.[161, 170, 189] Previous research also suggests that it is common for consumers to perceive juice[84, 88, 170, 172, 185] and sports drinks[84, 154, 161] as healthy or healthier than other sugar-containing beverages. While there is evidence indicating that consumers perceive juice to be healthier than fruit flavoured drinks (i.e. those containing low percentage of juice),[154, 167] it is unclear how consumer perceptions may differ between 100% juice and non-100% juice (i.e. those containing a considerable percentage of juice but <100%) as most existing research does not distinguished between the two. For example, an experimental study by Kim and House separate 100% fruit juice in their analysis but group other juices and fruit drinks with other beverages.[162] An experimental sorting study among Swiss parents and their children by Bucher and Siegrist[167] found that 100% fruit juice and 60% fruit juice were ranked similarly for healthfulness, although children ranked 100% fruit juice as slightly healthier while parents ranked 100% fruit juice slightly less healthy than 60% fruit juice.[167]

Much research regarding health-related perceptions of sugar-containing beverages has sought to address knowledge of sugar content and related health consequences of frequent consumption. Existing research indicates that there is a general awareness among consumers that beverages can be high in sugar and that frequent consumption of beverages high in sugar can lead to weight gain and long-term health consequences.[84, 88, 173, 184, 185, 189-192] However, there is a lack in knowledge regarding the actual amount of sugar within beverages,[58, 89, 165, 171, 172, 176, 185, 189] and this is accentuated when considering beverages other than soft drinks.[161, 171, 184, 185] Rampersaud et al.[171] found that, while almost all adult participants in a US based study identified soft drinks as 'sugary', just over half identified sports drinks as sugary (66%) and less than a quarter (25%) identified 100% fruit and vegetable juice as sugary.[171] A study by Moran and Roberto[182] with parents residing in the US similarly found that fruit drinks, juice, sports drinks and sweetened teas were viewed as containing less sugar and being less likely to increase their child's risk of weight gain,

Table 2.1. Gradient of perceived healthfulness across beverage categories, ranked by mean score of beverage healthfulness or % rated healthy

Study descriptors			Least healthy → Most healthy								
Study	**Location; population.**	**Method**	**Energy/ soft drinks***	**Energy/ soft drinks***	**Energy/ soft drinks***	**Iced tea**	**Sports drinks**	**Fruit flavour drinks**	**Flavour waters**	**Juices**	**Water**
Moran et al. 2018[182]	US.; Parents (n=404)	Survey (n=14 drinks). 7pt Likert scale.	✓DSD	✓SD	—ED	✓	✓	—	✓	✓100%	✓
Thomson et al. 2017[177]	Aust.; Adults (n=770)	Survey (n=17 drinks). 5pt Likert scale.	✓SD	✓ED	✓DSD	—	—	—	—	✓	✓
Munsell et al. 2016[154]	US; Parents (n=982)	Survey (n=5 drink categories + 11 drinks). 9pt Likert scale.	✓SD	✓DSD	✓ED	✓	✓	✓	✓	✓100%	—
Bucher & Siegrist. 2015[167]	Switz.; Parent & child dyads (n=100)^	Experimental sorting study (n=20 drinks). Rank drinks along 3m line.	✓ED	✓SD	✓DSD	✓	✓	✓	—	✓	✓
Hennessy et al. 2015[74]	US; Parents (n=371)	Survey (n=5 drink categories). 10pt Likert scale.	✓ED/SD**	—DSD	✗FD	✓	✓	✗	—	—	—
Kim & House. 2014[162]	US; Adults (n=1,535)	Survey (n=13 drinks). 9pt Likert scale.	✓SD	✓DSD	—ED	—	—^^	✓^^	—	✓100%	✓

✓ confirmed beverage position in healthfulness gradient; ✗ did not match beverage position in healthfulness gradient; — category was not captured in stud; ED = energy drinks; SD = soft drinks; DSD = diet soft drinks; 100% = 100% fruit juice; ^Parents and children did ranking activity independently and beverage clusters were statistically similar; ^^Category was combined into non-carbonated drinks (fruit drinks/fruit cocktails/sports drinks); *Categories combined as commonly interchangeable between studies; **scores were equal.

diabetes and heart disease than sugar-sweetened soft drinks. Research focused on energy drinks also indicates that there is a moderate level of awareness among children, adolescents and young adults that energy drinks can pose potential health risks.[58, 77, 89, 163, 174, 176, 180] In a survey with adolescents and young adults residing in Canada, Cormier et al.[179] found that 46% of participants considered energy drinks to be bad for health. However, there appears to be a general lack of awareness among adolescents and young adults regarding recommended maximum limits for energy drink consumption that aim to prevent harms caused by overconsumption of caffeine.[77, 89, 176, 179, 187]

Across previous studies, several beverage characteristics are suggested as influencing perceptions of beverage healthfulness. Research suggests that beverages are commonly perceived as unhealthy, or less healthy, when they are viewed as having high amounts of sugar, artificial sweeteners, additives, caffeine, or energy.[84, 154, 161, 167] Conversely, beverages are commonly perceived as healthy, or healthier, when they are viewed as containing fruit or vitamins and minerals.[154, 161, 167, 170, 172, 178, 185, 188] It is also apparent across several studies that beverage 'naturalness' influences healthfulness perceptions.[84, 154, 161, 167, 188] Some research indicates that beverages containing characteristics viewed as making a beverage healthier may compete with consumer concerns for sugar content in beverages. For example, some research has indicated that consumers' concern for sugar in juice may be affected by perceptions of juice as being generally healthier and containing vitamins and other beneficial nutrients.[170, 172, 185] A study with children residing in Canada by Battram et al.[84] found that some participants viewed sports drinks as unhealthy due to having a high sugar content, while others viewed them as healthy due to hydrating properties. Further, the type of sugar listed may also influence perceptions of whether sugar content is considered problematic, with some research indicating that beverages seen to contain 'natural' sugars are viewed as healthier than those seen to contain 'added' sugars.[171, 185]

Even when consumers generally consider beverages as unhealthy, the aforementioned beverage characteristics may influence perceptions of beverage healthfulness. In an experimental study with parents and their children, Bucher and Siegrist[167] found that high sugar content was the strongest predictor of perceived unhealthfulness of beverages, followed by artificial sweeteners, while fruit content was positively associated with higher perceived beverage healthfulness. Interestingly, the authors found that while soft drinks

were generally perceived as unhealthy, it was common for certain fruit-flavoured soft drinks (i.e. raspberry squash and elderflower soda) to be perceived as healthier than other soft drink flavours (i.e. cola, orange soft drink and lemon soft drink) and some other beverages (i.e. iced tea and sports drink).[167] Other research shows that young adults may choose to consume energy drinks for health-related reasons including weight loss, and supporting health and good nutrition,[179, 183] despite general perceptions that energy drinks are unhealthy. Concern for other beverage ingredients may also be held above those for sugar, increasing the perceived healthfulness of beverages high in sugar. A study with parents in the US by Munsell et al.[154] found that participants were less concerned about sugar content than other ingredients such as caffeine and artificial sweeteners. Research suggests that there may also be confusion about whether non-calorically sweetened drinks contain sugar.[171, 184]

Consumers may also view sugar-containing beverages as a valued source of energy in certain circumstances. Energy drinks and sports drinks are commonly seen as providing consumers with required energy during physical activity and sport and as aiding sports performance.[66, 77, 88, 89, 166, 173, 176, 179, 181, 185, 186] In a survey with children aged 12-14 years in the UK, Fairchild et al.[173] found that one in six (16.9%) participants rated sports drinks as the best beverage to consume during physical activity, that is, as better than plain water. Miller et al.[185] found that consumption of sugar-containing beverages may be considered unproblematic by parents and young adults when viewed as balanced with other dietary patterns and exercise. Beyond physical activity and exercise, research has found that adolescents and young adults also consume energy drinks during study, work, social gatherings, and while gaming,[77, 89, 165, 175, 176, 178-181] with their consumption suggested to be driven by a desire for a general energy boost, to combat tiredness, to assist with alertness and concentration, and to improve their mood.[58, 66, 77, 87, 89, 165, 175, 176, 178, 180, 181] Further, a study by Ha et al.[174] with adolescents residing in South Korea found that perceived benefits of energy drink consumption were the strongest predictor of use.

2.4 Influence of perceived healthfulness on consumption

Perceptions of healthfulness may influence consumption of sugar-containing beverages. In a survey with adults residing in the US, Phan and Chambers[188] found that over a third of

participants (35%) indicated they select beverages they view as healthy or that enable them to maintain a balanced diet to aid in weight control. Research with a general adult population in the US by Kim and House[162] found that perceived healthfulness of sugar-containing beverages was associated with consumption. The study also found that consumption of non-carbonated sugar-containing beverages (i.e. fruit drinks, fruit cocktail and sports drinks) were more sensitive than carbonated sugar-containing beverages (i.e. soft drink) to changes in perception of healthfulness.[162] Research with parents has similarly found that parents allow their children to drink sugar-containing beverages when they perceive the beverages to be healthier.[74, 154, 182] However, one study with parents found general perceived healthfulness of beverages was associated with their own and their child's consumption, while perceptions of high calorie and sugar content was not.[74] Similarly, previous research found that perceptions that sports drinks are sugary, or that their consumption can lead to tooth decay, was not associated with consumption.[164, 173]

When considering whether knowledge of adverse health outcomes is associated with sugar-containing beverage consumption, current research is mixed. For example, research in the US with adolescents[190] and Hispanic adults[191] have found no association, while research with general adult populations in the US[192] and South Australia have found negative associations.[189] Qualitative research with young adults has further suggested that the health consequences of frequent sugar-containing beverage consumption are viewed as long-term and therefore of low personal relevance, suggesting that these are potentially limited in their influence on beverage choice for young people.[88, 170, 185] Therefore, while perceptions of beverage healthfulness may influence consumption of sugar-containing beverages, existing research suggests that knowledge of sugar content and adverse health consequences may not be the only consideration regarding beverage healthfulness that influence beverage consumption.

2.5 Summary and research gap analysis

Existing research suggests that health-related marketing of sugar-containing beverages is common and that there are a range of ways that sugar-containing beverages are positioned as healthy through their marketing. Health-related marketing has previously been captured in diverse ways across existing research and, when synthesised, provide an idea of what

types of claims are likely to be present across the sugar-containing beverage market. However, there is a lack of comprehensive research quantifying and characterising the health-related marketing of sugar-containing beverages, particularly that which is not commonly captured in the regulated definitions of health and nutrition content claims; I seek to address this gap in research through this thesis. There is also a growing body of research focused on consumer perceptions and knowledge of sugar-containing beverages and this has largely addressed consumers' knowledge and perceptions regarding the sugar content and adverse health consequences of frequent consumption. While research indicates that perceptions of high sugar content may influence perceptions of beverage healthfulness, additional research also indicates that there are other beverage characteristics that influence negative and positive health-related perceptions of beverages. Little is known about how these negative and positive health-related perceptions are navigated when making an overall assessment of whether a beverage is healthy or healthier and how this may in turn influence consumption; I also seek to address this gap in research through this thesis.

2.6 Chapter conclusion

In this review I have synthesised the current literature on health-related marketing and consumers' health-related perceptions of sugar-containing beverages. I have identified two particular gaps in current research that I will focus on to address the research aims for this thesis. Through characterising the current health-related marketing of sugar-containing beverages in Australia and exploring how consumers navigate positive and negative health-related perceptions regarding sugar-containing beverages, I will assess how current marketing practices might correspond with and influence consumer perceptions. Details of the thesis methodology outlining the research design presented in Chapter 3.

Chapter 3: Research design and methodology

3.1 Chapter outline

In this chapter I present an overview of the methodology and research design used in this thesis. Given this is a thesis by publication, there will be some overlap in the details presented here and in the methods sections presented within publications and manuscripts. To reduce duplication, I primarily focus on explaining and justifying the rationale behind the methodological approach and methods used within studies, and how they address my research questions. I also explain and justify the overarching methodological approach of the whole research project and how each study fits within this.

3.2 Epistemological framework

I have broadly taken a critical realist approach in this thesis. Critical realism views ontology (i.e. the nature of reality) and epistemology (i.e. our knowledge of reality) as separate entities with the former not reducible to the latter.[193] Critical realism attempts to combine and reconcile ontological realism (which implies that there exists an objective reality) and epistemological relativism (which implies that our knowledge of reality is subjective and contextual).[194] In this sense, I take the general stance that there is a reality, independently of our knowledge of it, and that the social reality we encounter is constructed.[193] Critical realism assumes the position that individuals and social structures are two separate but interactive phenomena,[194] and so critical realist research often seeks to demonstrate connection between individual beliefs and social structures and document how these overlap and interact.[193] Applying this to the research at hand, this thesis examines marketing systems as socially constructed structures in which manufacturers, advertisers, consumers and socio-cultural norms interact.[195]

From a critical realist point of view, researchers and their research are interactive in that a researcher's personal belief system and the social forces around them influence their inquiry.[196] In this regard, I acknowledge that my overall research approach has been influenced by my perceptions, values and research interests which most closely align with what may be considered social constructionist epistemological lines of inquiry. In particular, I am interested in how the ways in which we come to understand and subsequently act in the

world is influenced by wider environmental factors, such as culture and society, and structures of power.[197-200] It is this view that has led to my particular research interest in how beverage manufacturers, who invest large amounts of money in the marketing of their products, and thus can be seen as a structure of power, influence individuals' perceptions and consumption of sugar-containing beverages. Therefore, much of the work reflected in this thesis draws particularly from constructionism.[197-199] I have also drawn on knowledge from the disciplines of marketing, public health and health promotion to guide me in how best to approach my research question.

3.3 Research aims and design

My aims for this thesis were to investigate how sugar-containing beverages are marketed as healthy, or as having health-related benefits, and, how health-related marketing influences consumers' perceptions of the healthfulness of sugar-containing beverages. I used the following series of related questions to achieve these aims:

1. How are sugar-containing beverages currently marketed as healthy via their product labelling?
2. What messaging is presented in television advertisements of sugar-containing beverages that associate these products with health?
3. How do Australian young adults aged between 18 and 25 years conceptualise what makes a beverage healthy, or healthier?

I addressed each of these sub-questions in a separate study, with my first two studies focusing on addressing how sugar-containing beverages are currently marketed as healthy, and my third study focusing on addressing consumer perceptions.

I have used quantitative and qualitative methods, selecting methods through considering those which could best address my research questions.[194] I decided to take a mixed methods approach and use both extensive (via quantitative) and intensive (via qualitative) data collection and analysis methods to address the overarching research aims from different angles.[194, 201] I used quantitative data collection and analysis to document the health-related marketing of sugar-containing beverages and to identify trends in marketing practices (study 1). I used qualitative data collection and analysis to explore the health-related marketing of sugar-containing beverages (study 2) and to explore consumer perceptions of beverage

healthfulness (study 3). While research exists on both topics separately, as discussed in Chapter 2, there is little research that draws a connection between the health-related marketing of sugar-containing beverages, and consumer perceptions and consumption of sugar-containing beverage healthfulness. I explored these two lines of enquiry and used a convergent mixed methods approach,[202-205] through which I integrated the findings from these three individual studies in the concluding chapter of this thesis to show how the two overlap and interact in order to address the overarching research aim.

I purposefully selected product labelling and televised advertisements to address the first aim of my research regarding how sugar-containing beverages are marketed as healthy. Firstly, I selected product labelling and televised advertisements as points of inquiry as doing so enabled me to examine two different forms of product marketing (i.e. product and promotion).[100] Secondly, the type of communication most suited to, and enabled by, product labelling and televised advertisements differ, and the types of health-related messages presented may therefore also differ. Product labels are largely concerned with communicating the characteristic of a product through 'product-centred' advertising, and their format is better suited to reasoned-based messaging; this is mostly done through making product claims.[206, 207] Conversely, televised advertisements are largely concerned with communicating the benefits to the consumer in using the product through 'user-centred' advertising, and their format is well suited to emotional-based messaging; this is mostly done through implicit messaging that seeks to reflect the wants, needs and desires of a target audience.[206, 207] Therefore, my main premise for undertaking a mixed methods design was the appropriateness of different methodological approaches in addressing the marketing via labels and marketing via television advertisements. In using a mixed methods approach, I was able to answer my research question more comprehensively.[202-205]

In Study 1, I chose to employ the method of content analysis to examine beverage labels. Content analysis is well suited to processing the quantity and type of data gathered from examining product labels, as similarly demonstrated in previous research.[112-117, 155-160] Using content analysis enabled me to examine all sugar-containing beverage labels, which in turn enabled me to gain an understanding of the extent of beverages on the Australian market that are being marketed as healthy. In Study 2, I chose to employ a multi-modal discourse analysis to examine the messaging in television advertisements. Although previous research

on televised advertising of food and beverages often employ a content analysis approach,[59, 120, 129] I decided to use a method that enabled me to explore the more complex nature of messages presented within television advertisements. Given the form of communication, messages are much more ambiguous in television advertising and require a decoding process which relate the internal structures presented within the advertisements to each other and to references from the external world;[207] this is best suited to a qualitative approach. In Study 3, I used thematic analysis to explore focus group data in order to address consumer perceptions of beverage healthfulness. Focus group data are well suited to addressing topics where little existing research exists, here, consumer perceptions of beverage healthfulness, and thematic analysis is an appropriate method for analysis of focus group data. The framework below maps the studies included in this thesis (Figure 3.1).

3.4 Scope of beverages included in research

This thesis specifically sets out to address sugar-sweetened beverage consumption as a contributor to the public health problem of high population free sugar consumption. Sugar-sweetened beverages are most commonly defined in research and by health organisations as 'all non-alcoholic water based beverages with added sugar, such as non-diet soft drinks, energy drinks, fruit drinks, sports drinks and cordial.'[26] Therefore, I have excluded non-sugar containing beverages (i.e. non-calorically sweetened beverages) from the research in this thesis. To ensure feasibility of the research project, I have also excluded alcoholic beverages and milk-based beverages, both of which bring additional health and nutritional considerations. As 100% fruit and vegetable juice comprise 'free', opposed to 'added', sugar, they are not currently included in the definition of sugar-sweetened beverages used in many studies, despite containing high amounts of free sugar.[208] I have chosen to incorporate 100% juice into the scope of beverages included within this research project and I use the term 'sugar-containing beverages' to reflect this. Much of the previous research assessing the health effects of frequent sugar-sweetened beverage consumption has excluded 100% juice, and evidence specifically regarding the health effects of frequent 100% juice consumption is mixed.[48, 209-212] This has left a gap in the literature that has made it difficult to provide clear public health policy and intervention guidance.[213] However, there is strong evidence regarding the metabolism of free sugars via liquid and their consequential adverse effect on weight gain and health; this informed the WHO recommendations for reduced 'free' sugar

intake.[14] Given the existing evidence regarding 'free' sugars and the need for more research to help provide evidence regarding 100% juices, future research on sugar-sweetened beverages should include 100% juice to develop more substantial evidence that can be accumulated for future policy and interventions addressing sugar-sweetened beverage consumption. Further, as previous research (as identified in Chapter 2) has indicated that nutrition-related claims are prevalent on juice labels[117, 158] and that consumers may perceive juices to be healthier, to contain less sugar, and to be less likely to increase the risk of weight gain and NCDs than other sugar-sweetened beverages,[84, 88, 154, 162, 167, 170-172, 177, 182, 185] the inclusion of 100% juices is particularly relevant to the aims of this research project.

It should be noted that, while this has been the overarching approach to defining the scope of beverages included within this research project, the inclusion and exclusion of beverages slightly varies in Study 2 and Study 3 due to differences in the methods employed and feasibility. In Study 2, advertisements for sugar-containing milk-based beverages have been included. This decision was made to reflect feedback that was received by a peer reviewer of the published paper for Study 1. The reviewer indicated that there was a growing interest in research addressing sugar-containing milk-based beverages within the public health and scientific community, and, given preliminary analysis found health-related messaging to be similar among the milk-based beverages to other sugar-containing beverages within the advertisements, it was feasible to include them in the study. Additionally, while advertisements solely for non-sugar beverages were excluded, advertisements that included both sugar and non-sugar product varieties were included in the sample for analysis. In Study 3, sugar-containing beverages were used as prompts in focus group discussions and one plain water (i.e. non-sugar) was also used for comparative purposes. Finally, I was unable to control for participants raising discussion about other beverages (e.g. non-calorically sweetened beverages) given the nature of focus groups. The specific beverages that I have included are again defined in each corresponding research paper or manuscript to ensure clarity.

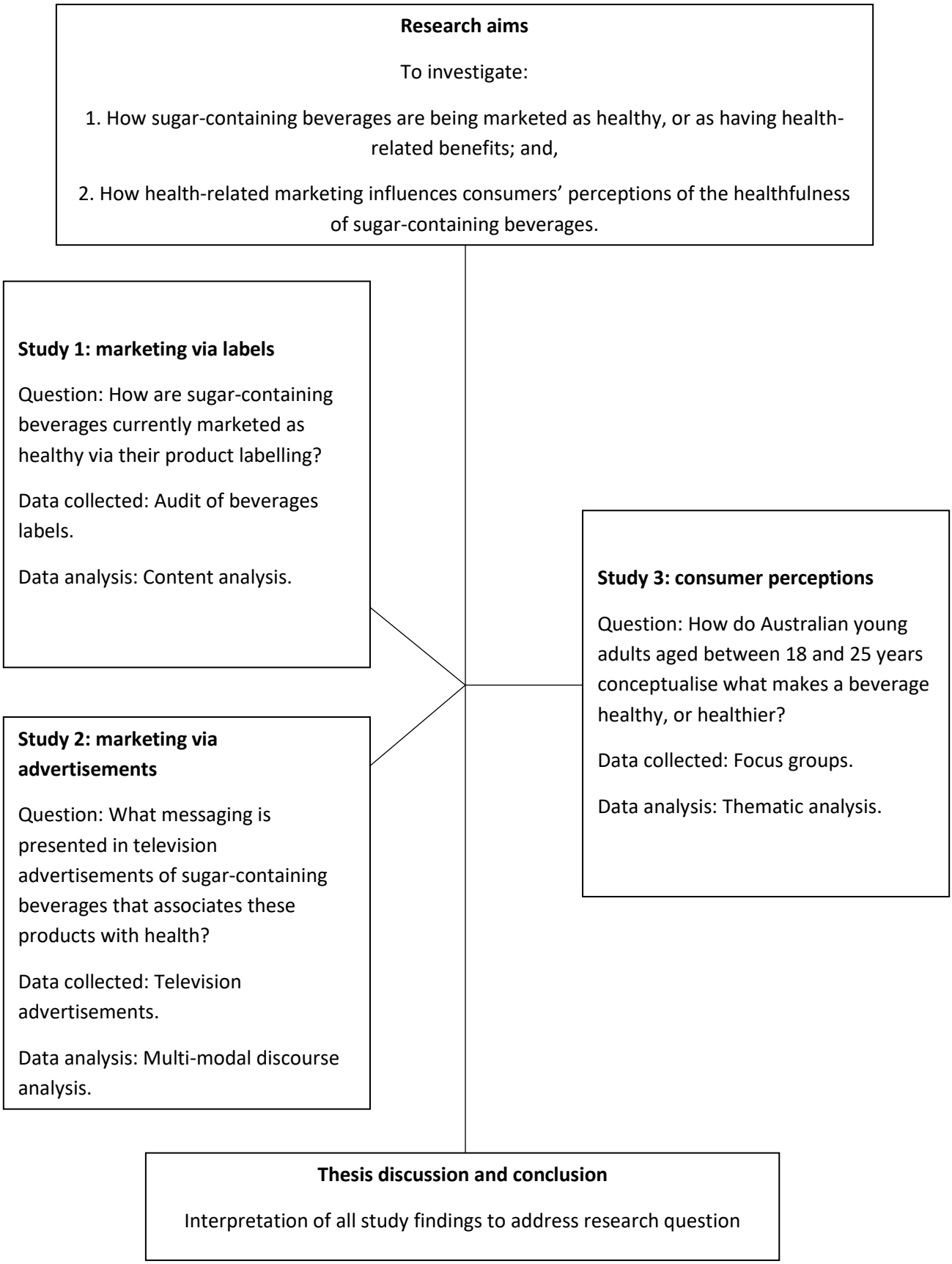


Figure 3.1. Study design

3.5 Reflexivity

Research is not a passive process. Researchers take an active role in the process of knowledge production that includes the decisions they make about what to study, the research design, data collection and analysis methods, and how they report the findings.[214-216] This is true for both quantitative and qualitative methodologies, although qualitative methods are often criticised as having the inherent limitation of subjectivity.[216] However, in this thesis I have taken the position that, when combined with critical self-reflection and dialogue with others (e.g. supervisors and reviewers), subjectivity through the researcher's viewpoint is a valid resource that can be harnessed to develop a more extensive understanding of the research topic.[216, 217] Practising reflexivity is a way to acknowledge the active role of the researcher and help make explicit their contribution to the research and interpretive process; this can be achieved through acknowledging their experiences, beliefs and personal history and the ways this might influence their research.[216] Therefore it has been important throughout the research project for me to be reflexive about my own sociocultural positioning, scholarly knowledge and theoretical assumptions, and to consider how these may have shaped the decisions I made when approaching this research project.

I have already discussed my theoretical assumptions in section3.2 above. Regarding my own sociocultural positioning, I am a health-conscious female, with tertiary education in health sciences and health promotion, and my values and understanding of nutrition and health are influenced by this. Throughout the research project I consciously explored health-related marketing using a broad definition of health which may not necessarily align with how I personally understand the role of nutrition in health. I actively used my scholarly knowledge of the research topic at hand, and further explored the literature on health ideologies, current health-related marketing trends, and current sociocultural ideals, values and practices in attempt to develop a thorough understanding and analysis of the research topic. However, I also had to ensure that while my scholarly knowledge informed the analytical process, it did not dominate the process, to ensure that the analyses remained grounded in the data.

I also considered how I consciously and subconsciously engaged with my research topic in my daily life. As I have set out in Chapters 1 and 2, sugar-containing beverage marketing is

ubiquitous, and consumption is commonplace. This means that I am inevitably exposed to the marketing of sugar-containing beverages and am commonly in situations where consumption occurs. The increasing public interest and concern regarding sugar, and sugar-containing beverages, means that I am also often exposed to discussions of sugar and sugar-containing beverage consumption and health and wellbeing through media and peer discussions. These experiences in my daily life often sparked thoughts and ideas relating to my research and wider understanding of the topic.

I was also a young adult at the beginning of this research project and was aware that young adults are commonly targeted in the marketing practices of sugar-containing beverage manufacturers as this was a topic I had previously studied during my honours research project.[63, 218] Being a young adult also meant that I fell within the demographic that I researched in Study 3. While this meant that I was able to identify marketing practices that may appeal to young adults, particularly those with similar sociocultural experiences, values and ideals to myself and my peers, I was also careful to ensure that I explored all marketing practices observed in my analyses equally for how they may appeal to wider audiences with differing sociocultural positioning. I also made a conscious effort to conduct a thorough and systematic coding and analysis process in each study to ensure that I did not preference analysis of marketing that I found personally appealing. Throughout the research project, discussions with supervisors and other academics were helpful in assisting me in self-reflecting on the research to help ensure that I was not making assumptions based on my own knowledge and experiences that were not supported by the data.

Chapter 4: Audit of beverage labels

4.1 Chapter outline

This chapter presents Study 1 which aimed to answer the research question: *how are sugar-containing beverages currently marketed as healthy via their product labelling?* To address this research question, I conducted a cross-sectional audit of pre-packaged beverages sold in South Australian supermarkets and content analysed the labels of sugar-containing beverages.

Given health-related marketing has previously been captured in diverse ways across existing research, this study contributes to the existing literature by comprehensively quantifying and characterising the health-related marketing of sugar-containing beverages via product labelling within the current Australian market. It further informs previous research by analysing both regulated and non-regulated features on labels that act as health-related marketing. Given the increasing health-related and 'better-for-you' marketing trend is suggested to be a response to increasing consumer concern for sugar content,[110, 111] I also observed the sugar content of beverages and present the results of how this marketing varies across sugar content of beverages.

The research is presented in the form of two peer-reviewed publications (Sections 4.2[219] and 4.5[220]) and a supplementary analysis (Section 4.3). I firstly present a comprehensive overview of the features present on labels in the first publication. Then, in a supplementary analysis, I assess the observed features against the regulated FSANZ Code and discuss specific limitations of this current regulation. Lastly, in a second publication I present an analysis of the use of the Australian and New Zealand Health Star Rating System which was found to act as a form of health-related marketing on beverage labels.

Statement of Authorship

Title of Paper	Industry use of 'better-for-you' features on labels of sugar-containing beverages.
Publication Status	☑ Published ☐ Accepted for Publication ☐ Submitted for Publication ☐ Unpublished and Unsubmitted w ork w ritten in manuscript style
Publication Details	Brownbill AL, Miller C, Braunack-Mayer A. Industry use of 'better-for-you' features on labels of sugar-containing beverages. Public Health Nutr. 2018;21(8):3335-43.

Principal Author

Name of Principal Author (Candidate)	Aimee Lee Brownbill		
Contribution to the Paper	Conceptualised and designed study, developed coding tool, collected and analysed data, drafted manuscript, reviewed and revised final manuscript, acted as corresponding author.		
Overall percentage (%)	85%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	13.03.2020

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);
ii. permission is granted for the candidate in include the publication in the thesis; and
iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Professor Caroline Miller		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study, coding tool and data analysis. Reviewed manuscript.		
Signature		Date	13·03·2020

Name of Co-Author	Professor Annette Braunack-Mayer		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study, coding tool and data analysis. Reviewed manuscript.		
Signature		Date	13.03.2020

4.2 Industry use of 'better-for-you' features on labels of sugar-containing beverages

4.2.1 Abstract

Objective: To examine the ways in which sugar-containing beverages are being portrayed as better-for-you via features on product labels.

Design: Cross-sectional audit of beverage labels.

Setting: Adelaide, Australia. Data on beverage labels were collected from 17 grocery stores during September to November 2016.

Subjects: The content of 945 sugar-containing beverages labels were analysed for explicit and implicit features positioning them as healthy or 'better-for-you'.

Results: The mean sugar content of beverages was high at 8.3g/100ml and most sugar-containing beverages (87.7%) displayed features that position them as better-for-you. This was most commonly achieved by indicating the beverages are natural (76.8%), or contain reduced or natural energy/sugar content (48.4%), or through suggesting that they contribute to meeting bodily needs for nutrition (28.9%) or health (15.1%). Features positioning beverages as better-for-you were more common among certain categories of beverages namely coconut waters, iced teas, sports drinks and juices.

Conclusions: A large proportion of sugar-containing beverages use features on labels that position them as healthy or better-for-you despite containing high amounts of sugar.

4.2.2 Introduction

The high global consumption of sugar-containing beverages has gained international public health attention due to its contribution to obesity[42] and non-communicable diseases such as type II diabetes,[48] cardio-vascular disease risk factors[52] and tooth decay.[50] A number of governments have introduced policies to reduce consumption of sugar-containing beverages through taxation, restrictions on marketing and public awareness campaigns.[213] It is therefore unsurprising that consumers are becoming concerned about the adverse health effects of these beverages.[221]

Community concern about sugar consumption appears to have led to changes in the marketing of sugar-containing beverages, for example through increased advertising of beverages as 'better-for-you' (BFY).[221] 'Better-for-you' is a term used increasingly by the food and beverage industry in marketing publications and in market reports.[221, 222] It is starting to appear in public facing websites (e.g. PepsiCo)[223] where "better-for-you" brands (e.g. Pure Leaf iced teas and Grain Waves) are presented in contrast to "fun-for-you" brands (e.g. Pepsi; Doritos). The BFY category is broad and ill-defined,[221, 222] including both health and nutrition claims and products classified as 'good' ("products that generally are considered wholesome").[224]

In Australia, food and beverages are required to display a Nutrition Information Panel. Nutrition information labels are common in many countries; however, their relative complexity often results in low usage among subpopulations at the highest risk of developing nutrition related chronic illnesses.[225] Health and nutrition claims are another source of nutritional information provided on food and beverage packages. While it is the manufacturers' decision whether to display health and nutrition claims or not, regulations exist around their use in Australia.[140] The use of health and nutrition claims on food and beverage labels is well documented. A number of studies show that consumers believe a product is healthier if it carries a health or nutrition related claim[130-133] and a recent meta-analysis concluded that health and nutrition claims have a substantial effect on dietary choices.[135] However, these studies often do not address broader, unregulated, BFY features on food and beverage labels which has been identified as a limitation of previous research.[155, 226, 227]

This study describes the features on sugar-containing beverage labels that position them as BFY, encompassing features that include, but are not limited to, health and nutrition claims. We defined a BFY feature as '*text or an image on packaging that either claim or imply that a product has health-related benefits or is a healthier option'.* This definition includes both claims that directly state a health benefit and broad terms that imply the product may play a role in health or well-being. The display of BFY features on labels may lead consumers to believe these sugar-containing beverages are healthier for them than they would if the labels did not display BFY features; this is known as a 'health halo' effect.[147, 148] Understanding the messaging communicated to consumers through the BFY construct has the potential to provide further insight into trends of sugar-containing beverage consumption, including shifts from soda to other beverage types.

4.2.3 Methods

Data collection

During September to November 2016 we conducted an audit of labels on all non-alcoholic/non-dairy packaged beverages in South Australian grocery stores. We selected 17 stores from leading grocery store chains.[228] Stores were purposively sampled from across areas of differing socio-economic status according to the 2011 Socio-Economic Index for Areas score[229] to ensure that any potential differences in the availability of beverages in differing socio-economic areas were captured. The method of data collection was based on similar studies of packaged food and beverage label audits.[113, 160, 230] We photographed the packaging of all non-alcoholic/non-dairy beverages 1 litre (34 fl oz.) or less from each store. Multipacks and packages where information was not presented in English were excluded. The study was granted an exemption from Human Research Ethics Committee review.

Study sample

We recorded product descriptions (product name, flavour and package size). Product duplicates were removed from the sample. Multiple package sizes were also excluded after initial analysis of a subset of products found no difference between features on different sized of products.

We classified products by beverage type (*Alcohol substitutes, coconut water [flavoured or plain], concentrates, energy drinks, fruit drinks, iced teas, juices [100% juices separated],*

soda, sports drinks, flavoured water [still or sparkling], and other [i.e. probiotic drinks]; see Appendix E for definitions) and recorded the sugar content. For the purposes of this study, beverages were categorised as either sugar-free (<1g/100ml) or sugar-containing (≥1g/100ml). Sugar-containing beverages were further categorised depending on their sugar content as low sugar (≥1 and ≤2.5g/100ml), medium sugar (>2.5 and <5g/100ml), high sugar (≥5 and <10g/100ml) and very-high sugar (≥10g/100ml). Low sugar was categorised based on requirements for making a low sugar claim on packages.[140] High and very-high sugar was categorised was based on World Health Organization recommendations,[14] with very-high sugar aligning with the recommendations of limiting daily free sugar intake to approximately 50g, and high sugar aligning with extended recommendations to limit daily free sugar intake to 25g (calculations based on a standard 500-600ml RTD beverage). Free sugar is defined as 'monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates'.[14] For the purpose of the current study, this means simple sugars added to beverages and those naturally present within juice. Products in the final sample were assigned unique identifiers for products and their accompanying images.

Data analysis

Beverage labels were analysed through content analysis.[231] Using the definition of BFY features above, we developed a coding framework for the content analysis (see Appendix F). The coding framework was based, firstly, on health and nutrient content claims, as defined by the Food Standards Australia New Zealand Code on Nutrition Health and Related Claims[232] and, secondly, on relevant literature on food packaging that has suggested that particular features on packages are perceived to imply health benefits. We conducted an initial analysis to refine categories and capture new codes. Through this process, we identified 4 new codes (superfoods, goodness, wellness and isotonic/hypotonic). The coding framework was further developed and refined through an iterative process that included coding random subsamples and discussing any issues among the authors until consensus was reached. Before finalising the framework, an independent researcher was engaged to code a random subsample (2.5%) of products and any disagreements or problems with the framework were discussed amongst the authors until consensus was reached. The final coding framework consisted of 31 codes for BFY features which were grouped into 8

categories (presented below). Beverage labels were coded by the lead author for the presence or absence of each BFY feature anywhere on the label. At completion, a random subsample (10%) of products were coded by an independent researcher and the percentage agreement was calculated (mean percentage agreement: 94.5%; range: 77-100%). Cohen's Kappa and other similar inter-rater reliability tests were not used because the underlying assumptions do not fit our dataset. The Kappa statistic corrects for the percent agreement due to chance agreement which is assumed to apply to all observed ratings. However, this assumption is problematic when there is a low likelihood of chance agreement, such as when the prevalence of one outcome is high (e.g. large proportion of zeros due to the absence of a characteristic) as was the case in our dataset. The nature of our dataset aligns well with circumstances in which percentage agreement is an appropriate measure.[233]

4.2.4 Results

We identified 1,123 unique beverage products, of which 84% (n=945) contained sugar. The sugar-containing beverages formed the sample for the subsequent analysis. Only 5.2% (n=49) of the sugar-containing beverages were low in sugar. The mean sugar content of beverages was 8.3g/100ml (SD=3.2) and ranged from 1.0-16.9g/100ml (excluding beverages with missing, n=4, or non-standardised reporting of sugar content on labels, n=10). Energy drinks had the highest mean sugar content followed by soda and 100% juices, with a large proportion of beverages within these categories containing a high or very-high sugar content (100%, 96.2% and 98.0% respectively). Although coconut waters and iced teas on average had lower amounts of sugar than other beverage categories, over a third of beverages within these categories were high in sugar (See Table 4.2.1).

Almost all sugar-containing beverages contained BFY features on their labels (96.8%), with 90.5% of packages displaying fruit or vegetable features. When fruit or vegetable features were excluded, BFY features remained on a large proportion of products (87.7%), with an average of 3.3 (SD=2.6) unique BFY features per product. Most beverages carried at least one BFY feature (See Table 4.2). Coconut waters carried the highest number of unique BFY features with an average of 8 BFY features per product. Although beverages within the soda and energy drink categories had fewer BFY features on packages, at least one BFY feature was still present on over two thirds of sodas (68.4%) and roughly two thirds of energy drinks (62.1%).

TABLE 4.2.1. Sugar Content of Sugary Beverages by Beverage Category: South Australian Supermarkets (n=17), September – November 2016

Beverage Type	No. of Beverages (n=931)[*,†]	Sugar Content (g/100ml)					
		Mean Sugar Content	SD Sugar Content	Low Sugar (1≤2.5) %[‡]	Medium Sugar (>2.5<5) %[‡]	High Sugar (≥5g<10) %[‡]	Very-High Sugar (≥10) %[‡]
Energy Drink	29	12	1.7	0.0	0.0	6.9	93.1
Soda	132	11	2.0	0.8	3.0	16.7	79.5
Juice, 100%	293	10	2.2	0.0	2.0	51.9	46.1
Alcohol Substitute	25	9	3.5	0.0	16.0	36.0	48.0
Water, Flavoured Mineral	50	9	2.3	0.0	10.0	54.0	36.0
Fruit Drink	91	8	3.6	8.8	17.6	33.0	40.6
Juice (not 100%)	33	8	3.1	6.1	9.1	63.6	21.2
Concentrate	83	7	2.5	2.4	13.2	68.7	15.7
Sports Drink	39	5	1.3	2.6	15.4	82.0	0
Coconut Water, Flavoured	25	5	1.3	0.0	52.0	48.0	0
Iced Tea	78	4	2.2	24.3	38.5	37.2	0
Coconut Water, Plain	35	4	1.1	8.6	57.1	34.3	0
Water, Flavoured Still	13	3	1.2	53.8	46.2	0	0
Other [Probiotic Drinks]	5	2	0.0	100.0	0.0	0	0

[*] Beverages missing sugar content on labels (n=4)

[†] Beverages removed due to un-standardised reporting of sugar content, i.e. concentrates not as mixed with water (n=10)

[‡] Reported as percentage of beverage category

TABLE 4.2.2 Better-for-you (BFY) features on sugary beverage labels by beverage category:[*,†] South Australian supermarkets (n=17), September – November 2016

Beverage Type	No. of Beverages (n=945)	Mean no. of BFY Features	SD BFY Features	Min. no. of BFY Features	Max. no. of BFY Features	Presence of at least one BFY Feature, %[‡]
Coconut Water, Flavoured	25	8.0	2.8	3	13	100
Coconut Water, Plain	35	7.9	3.0	1	13	100
Iced Tea	78	5.5	2.3	1	10	100
Sports Drink	41	5.1	2.1	3	10	100
Juice	33	3.9	2.3	0	8	90.9
Juices, 100%	293	3.8	1.8	0	10	97.3
Fruit Drink	91	2.7	1.8	0	7	92.3
Water, Flavoured Still	13	2.3	0.6	1	3	100
Water, Flavoured Mineral	50	1.8	1.6	0	5	80
Alcohol Substitute	29	1.8	1.5	0	4	79.3
Concentrate	90	1.5	1.4	0	7	67.8
Soda	133	1.2	1.2	0	4	68.4
Energy Drink	29	1.0	1.0	0	4	62.1
Other [Probiotic Drinks]	5	6.0	0.0	6	6	100

[*] Excluding fruit or vegetable features

[†] Reported as the occurrence of any one type of feature

[‡] Reported as percentage of beverage category

BFY features (Table 4.2.3)

Fruit or vegetables

The majority (86.3%) of beverages had text referring to fruit or vegetables on their packages and 61.1% had an image of fruit or vegetables. Energy drinks were the only type of beverage on which it was rare for images of fruit or vegetables to be displayed (3.4%; See Appendix G for supplementary data table). Fruit drinks and sparkling flavoured waters commonly displayed the servings or percentage of fruit or vegetables on their labels (52.7% and 40% respectively). Just under a third of beverage labels (29.1%) mentioned 'superfoods', with the most common superfoods being coconut (8.7%), berries (6.3%), ginger (6.2%) and green tea/kombucha (5.4%). Superfoods were most frequently included on the labels of coconut waters (100% of labels; expected as coconut waters in themselves are considered a superfood), iced teas (59%), juices (45.5%) and 100% juices (27.0%).

Natural

Three quarters of beverages (76.8%) contained features that implied that they were natural products, by using the term natural, organic, fresh, real, pure or raw or by stating an absence of artificial products (i.e. additives, preservatives, colours etc.). All iced teas, over 90% of coconut waters and 100% juices, and over 80% of fruit drinks and juices described their products as natural. 61.7% of sodas also included features on labels that described them as natural, with 31.6% using the term 'natural' itself and 32.3% stating an absence of artificial products.

Energy and sugar content

Almost half of the sugar-containing beverages (48.4%) referred to the product containing lowered, or natural, energy or sugar content, with 'no added sugars' and 'no concentrates' the most frequently used terms. Coconut waters and 100% juices were the most common types of beverages to carry these features with over 80% of products displaying one or more feature. More specifically, 78.2% of 100% juices and 62.9% of plain coconut waters contained a no added sugar claim and 40.3% of 100% juices and 60.0% of coconut waters (both plain and flavoured) contained a no concentrates claim. Coconut waters also had no/low-fat or cholesterol claims (60.0% plain and 76.0% flavoured). A small number of

beverage packages (7.9%) stated that the product was naturally sweetened or that the sugar was natural or from fruit.

Nutrition

Over a quarter of beverages contained features that focused on nutrition (28.9%). This was most commonly achieved through referring to specific nutrients (25.6%) such as 'high in Vitamin C'. Although this occurred across beverage types, it was most often used on sports drinks (68.3%) and coconut waters (60.0% flavoured and plain). Beverages also used broad terms such as nutritious/nourishing (5.7%) and this was most common on juices (27.3% juices and 12.3% on 100% juices).

Health

Fifteen percent of beverages contained features that were specifically related to health and wellbeing. Broad terms such as health/healthy were present most often on iced tea packages (32.1%) and coconut waters (28.6% plain and 16.0% flavoured), and terms such as wellness/wellbeing or revitalise/refresh were most common on energy drinks (27.6%), alcohol substitutes (24.1%) and juices (24.2%). References to specific health effects (e.g. claims about metabolism, cardiovascular/muscle function, immune system or digestive health) were less common; when present, these were most commonly found on juice (18.2%) and iced teas (12.8%).

Goodness

Fifteen percent of beverages used the term 'goodness' (e.g. "full of goodness" or "the goodness of blueberry"). This was most commonly used on juice labels (60.6% juice and 22.2% of 100% juices), iced teas (30.8%) and sparkling flavoured waters (24.0%).

Dietary Restrictions

A small number of products noted that the beverage was suitable for people with dietary restrictions (13%), with gluten free being the most common (10.4%). Flavoured coconut waters were the most likely to indicate that they were suitable for a range of dietary restrictions such as gluten free, vegan and lactose free, with 60.0% containing at least one or

more (37.1% in plain coconut waters) followed by iced teas which had 43.6% of products containing one or more feature per package.

Sport

Although there were relatively few sporting features on beverage packages across the sample (11.0%), all sports drinks contained sporting features and specifically referenced sport or exercise, with other commonly used features on sports drinks being electrolytes (100%) and hydration (78.0%). In addition, most coconut waters also displayed sporting features on packages (88.0% flavoured and 77.1% plain) often through reference to hydration (68.0% flavoured and 68.6% plain) and electrolytes (52.0% flavoured and 45.7% plain) and less commonly through direct reference to sport or exercise (24.0% flavoured and 8.6% plain). Almost one quarter of energy drinks (24.1%) used references to sport.

Better-for-you features and sugar content

Most beverages with high or very-high sugar content (n=759) carried a BFY feature on their label (85.8%; Table 4.2.4). Of these beverages with high and very-high amounts of sugar, 44.0% displayed a BFY feature related to energy or sugar content. Specifically, 34.3% of beverages with high and very-high amounts of sugar displayed a 'no added sugar' claim on the label and 6.7% indicated that the beverage was naturally sweetened or that the sugar was from fruit.

4.2.5 Discussion

This study found better-for-you features present on 96.8% of sugar-containing beverage labels, with an average of 3.3 unique features per label. These features align products with being natural, emphasise their fruit and vegetable content, emphasise other nutrient contents, favourably position sugar content and suggest functional properties for the beverages. By using these BFY features, beverages may be given a 'health halo'.[147]

Sugar-containing beverages are positioned as natural

Positioning beverages as natural appears to be at the centre of current BFY advertising with over three quarters of beverages in our study displaying natural features on their labels. Advertising products as natural is not new or unusual. Nature is often used to position

TABLE 4.2.3. Better-for-you features on sugary beverage labels: South Australian supermarkets (n=17), September – November 2016

Better-For-You Feature Categories/Codes	No. of Beverages (n=945)	Proportion of Beverages, %
Fruit or Vegetables	**855**	**90.5**
Fruit/vegetables in text	816	86.3
Images of fruit/vegetables	577	61.1
Superfoods	275	29.1
Serves or % fruit/vegetables	173	18.3
Natural	**726**	**76.8**
No artificial products	576	61.0
Natural	316	33.4
Pure or raw	152	16.1
Fresh	119	12.6
Real	115	12.2
Organic	111	11.7
Energy and Sugar Content	**457**	**48.4**
No added sugar	300	31.7
No concentrates	176	18.6
Naturally sweetened/sugar from fruit	75	7.9
Low kilojoules	51	5.4
No/low fat or cholesterol	42	4.4
Low/reduced sugar or % sugar-free	40	4.2
Unsweetened	3	0.3
Nutrition	**273**	**28.9**
Listed specific nutrients	242	25.6
Nutritious or nutritional	54	5.7
Health	**143**	**15.1**
Wellness	87	9.2
Health/healthy	72	7.6
Health effects	36	3.8
Goodness	**139**	**14.7**
Dietary Restrictions	**123**	**13.0**
Gluten free	98	10.4
Vegetarian or vegan	51	5.4
Dairy/lactose free	26	2.8
Sport	**104**	**11.0**
Hydration or rehydrate	79	8.4
Electrolytes	70	7.4
Sport or exercise	59	6.2
Isotonic or hypotonic	24	2.5
Performance	12	1.3

TABLE 4.2.4. Better-for-you features on sugary beverage labels by sugar content: South Australian supermarkets (n=17), September – November 2016

Sugar Content (g/100ml)	No. of Beverages (n=931)[†,‡]	Better-For-You Feature Categories/*Codes*, %[*]										Any BFY feature[§]
		Fruit or vegetables	Natural	Energy/ sugar	*(No added sugar)*	*(Naturally sweetened/sugar from fruit)*	Nutrition	Health	Goodness	Dietary restrictions	Sport	
Low Sugar (1≤2.5)	48	97.9	85.4	85.4	*(27.1)*	*(10.4)*	41.7	39.6	14.6	31.3	8.3	100.0
Medium Sugar (>2.5<5)	124	98.4	87.1	63.7	*(21.8)*	*(15.3)*	41.1	44.4	15.3	28.2	28.2	99.2
High Sugar (≥5g<10)	405	92.8	77.5	49.4	*(35.6)*	*(10.1)*	26.4	7.9	19.8	13.1	13.8	89.4
Very-High Sugar (≥10)	354	85.3	73.2	37.9	*(32.8)*	*(2.8)*	26.3	9.9	9.3	5.6	2.0	81.6

[*] Reported as percentage of beverages within sugar category displaying feature themes/codes

[†] Beverages missing sugar content on labels (n=4)

[‡] Beverages removed due to un-standardised reporting of sugar content, i.e. concentrates not as mixed with water (n=10)

[§]Excluding fruit or vegetable category

products as intrinsically good, healthy, fresh and innocent.[234] The commodification of nature has previously been documented for bottled water[235] and foods.[234] Our study shows that manufacturers are positioning sugar-containing beverages in the same way with coconut waters, iced teas and juices heavily using natural connotations on labels. Using the key word 'natural' was the most direct way this association was achieved with a third of packages doing so.

The frequent presence of fruit and vegetables on sugar-containing beverage labels also associate these beverages with being natural. The Coca-Cola Company have previously reported their efforts to 'capture the natural goodness of fruit and vegetables for beverage use,'[236] highlighting the importance of this positioning for advertising beverages. In our study, fruit and vegetables were present on labels in a range of ways that appeal to varying levels of consumer consciousness. Fruit or vegetable flavours and images were highly prevalent across beverage types, implicitly associating the beverages with being natural. On the other hand, while listing the serves of fruit and vegetable in a beverage were less prevalent, this more explicitly associated beverages with being natural, and nutritious, equating the consumption of juice to that of whole foods.

Promoting the absence of artificial (un-natural) products on labels was another common way through which beverages were positioned as natural. Claims such as 'no artificial products, colours, or flavours' can often be, and were, applied across beverage categories, including beverages such as sodas which could otherwise be considered as inherently unhealthy.

Sugar-containing beverages are positioned as a source of nutrition

Altering the nutritional profile of food and beverages through reformulation and fortification can be used by manufacturers to market products as a source through which nutrition is delivered.[237] Reformulation can be used to reduce the nutrients perceived by consumers as 'bad' for health and fortification increases the nutrients perceived as 'good' for health.[237] In our study, both of these strategies were used to promote sugar-containing beverages with labels addressing sugar and vitamin/mineral content of beverages.

Sugar is a nutrient of increasing concern by consumers.[221, 222] Our study found that labels address concerns about sugar by favourably positioning the sugar content of beverages, most commonly though 'no added sugar' claims which were present on just under a third of

labels. Beverages that included 'no added sugar' claims on their labels were still high in sugar, specifically free sugar. 100% juice is notably problematic in this regard, with over three-quarters of the 100% juices in our sample making a 'no added sugar' claim, while the mean sugar content of the category was only surpassed by soda and energy drinks.

Fortification of sugar-containing beverages can also be used to draw consumer attention toward positive nutrients rather than high sugar content. As such, the use of fortification positions these non-core (discretionary) products as a source of nutrients. This was evident on a quarter of labels which referred to the nutrient content of beverages, for example through claiming high vitamin and mineral content.

Sugar-containing beverages are positioned as providing functional benefits

Functionalism extends the concept of fortification from meeting adequate nutrient intake to providing optimal nutrition for enhanced health or bodily functions.[237] Functional beverages are often perceived to be novel and technological, invoking science through reference to physiological functions and health.[238] Although functional beverages comprise a relatively small segment of the market, their popularity is increasing.[239] Our study found that functionalism was advertised in two ways on beverage labels.

First, sports drink labels promoted functional benefits associated with achieving optimal sporting performance. Sports drink labels advertised electrolytes and the provision of optimal hydration for sporting performance. Scientific terms such as 'isotonic' and 'hypotonic' accompanied this positioning, further illustrating the scientific and functional positioning of these beverages.

Second, coconut waters were positioned as a *natural* functional beverage, with the labels advertising electrolyte content and hydration. Unlike sports drinks, few coconut water labels made direct reference to sport and exercise. Linking functional benefits with the idea of being natural, coconut waters capitalised on the purported benefits of electrolyte consumption (namely, sporting performance), and appealed to consumers who desire natural products.

Positioning high sugar beverages as better-for-you is misleading to consumers

Prior research on consumer evaluation of beverages for health purposes is limited and has not explored how beverages are being positioned as healthy.[162] However, existing research on positioning foods as healthy or BFY suggests that many advertising features we identified on beverages align with how consumers evaluate a product as healthy. For example, Luomala et al have shown how positioning food as natural influences consumers' opinions on whether a food is healthy or not.[240] Irmak, Vallen and Robinson found that renaming candy from 'candy chews' to 'fruit chews' can influence the health beliefs, and consumption, of candy.[149] Using BFY features on labels may therefore influence consumers' assessment of whether sugar-containing beverages are healthy, or healthier than other options.

Positioning beverages that contain high amounts of free sugar as BFY is potentially misleading. BFY features on labels disregard the source through which the purported benefits are being delivered,[241] and distract from the harms associated with consuming products high in free sugars.[14] For example, advertising that juice contains 'no added sugar' or 'natural' sugar from fruit and vegetables distracts from the high free sugar content of these beverages. Through positioning sugar-containing beverages as BFY, consumers may be influenced to select products they believe are health-promoting, which are in fact potentially harmful when over-consumed.

4.2.6 Public health implications

Our study has highlighted the ways in which sugar-containing beverages are being advertised as healthy on labels. The predominance of better-for-you features on these beverages further suggests that consumers are becoming increasingly concerned about health,[222] particularly in regard to sugar consumption from beverages.[221] Increased public concern around sugar consumption from beverages is a positive indicator for public health outcomes and it is not surprising that beverage manufacturers are implementing efforts to address this concern. Originally intended for improving public health, reformulation and fortification of food and beverages has also been adopted by manufacturers and is a common technique used for advertising purposes.[237] However, the use of natural ingredients, increased vitamin and minerals and 'functional ingredients', as advertised on sugar-containing beverage labels in our study, does not offset the harms associated with

high sugar consumption[14] from these beverages. Reformulation that leads to positive public health outcomes in obesity and related non-communicable diseases is only likely to occur through significant reduction in the sugar content of these beverages. Knowledge of the techniques used to position sugar-containing beverages as BFY can inform the development of public messaging that aims to increase community literacy and reduce population over-consumption of free sugars including sugar-containing beverages.

Our study has also highlighted that the positioning of sugar-containing beverages as better-for-you occurs despite existing regulations that aim to prevent the misleading advertising of unhealthy products as healthy.[232] We found that it was most common for implicit BFY features (such as fruit flavours and advertising natural ingredients) to be displayed on sugar-containing beverages. Research has demonstrated that implicit health-related labelling features, such as product titles[147] and colour,[148] increase consumer perceptions of the healthfulness of discretionary foods. It has further been suggested that implicit features have a stronger effect on consumer health perceptions than explicit nutrition claims through creating a health halo effect.[147] The prominence and effect of implicit health and nutrition related features, such as the BFY features identified in our study, therefore need to be considered in existing and future regulations, for example through broadening the scope of what is regulated. Such regulations can be further strengthened by restricting the use of all health and nutrition related features on labels to non-discretionary food and beverages. Australia has implemented such restrictions for health claims, with food and beverages being required to meet a pre-defined nutrient profile score to be eligible to display health claims.[140] These restrictions have not been extended to nutrition claims, which may explain why a quarter of sugar containing beverages advertised the presence of specific nutrients on labels.

4.2.7 Limitations

We restricted our study to the labels of water-based sugar-containing beverages, excluding milk based beverages which may also be high in added sugar. Milk based beverages may use different BFY features on their labels that were not identified in this study; analysis of the advertising features on sweetened milk labels would be complementary to our research. We also focused on advertising through labels which may differ from advertising through other

media. Further, while we have defined and measured BFY features on labels, our analysis cannot determine whether these features influence how people evaluate these beverages. The BFY features identified in this study should be tested in experimental research to explore the effect of these features on consumers' perceptions and consumption of sugar-containing beverages.

4.2.8 Conclusion

Many sugar-containing beverage labels include features that imply these drinks are healthy, or healthier than alternative beverages. If BFY features lead consumers to believe these beverages are healthy, this may influence consumption, with consequent negative implications for the health of the public. Those working in obesity prevention and public health must find ways to counter and/or prevent the misleading advertising of sugar-containing beverages as healthy.

4.3 Regulated nutrition, health and related claims on labels of sugar-containing beverages; supplementary results

The results from the preceding paper show that health-related positioning of sugar-containing beverages is pervasive in the non-alcoholic beverage market.[219] The results provided a detailed characterisation of the types of health-related claims, or 'features', presented on beverage labels. While the results show that these claims are commonly used on beverages high in sugar, an analysis specifically presenting the proportion of claims regulated by the Food Standards Australia New Zealand Code on Nutrition, Health and Related Claims (FSANZ Code) was unable to be included in the published paper. In order to address how the health-related claims presented on beverage labels align with the FSANZ Code, I have provided supplementary results and a short discussion of these specific results below.

As discussed in Chapter 1, the FSANZ Code regulates the use of health and nutrition content claims in the advertising of food and beverages in Australia and New Zealand.[140] Health claims state a specific food-health relationship and are divided into general-level health claims and high-level health claims, with the former having 200 pre-approved claims and the later only having 13.[140] Nutrition content claims state the presence or absence of nutrients. As of March 2016, products carrying a health claim are also required to meet a nutrient profiling score, in which a higher score equates to a less healthy product with higher amounts of amounts of energy, saturated fat, sugar and sodium. Points are subtracted from the score when products contain healthy ingredients such as fruit or vegetables, protein and fibre.[242]

4.3.1 Supplementary analysis and results

This is a supplementary analysis of the dataset as described in the preceding publication.[219] The analysis has pooled the observations from the codes indicated in Appendix F which capture health claims (either high- or general-level) and nutrition content claims as defined in the FSANZ Code.[140] The remaining codes were also pooled to represent claims not captured within the FSANZ Code. The results are presented below in Table 4.3.1. The supplementary analysis shows that it was uncommon for the labels of sugar-containing beverages to display health claims (3.8%) but over half (63.2%) displayed nutrition content claims regulated by the FSANZ Code. The results also show that the majority of sugar-

containing beverage labels (85.0% when fruit or vegetable related claims are excluded) displayed claims, or features, that are not currently regulated by the FSANZ Code. Further, it was common for sugar-containing beverage labels to simultaneously display regulated and unregulated claims/features (60.0% when fruit or vegetable related claims are excluded). Less than a quarter of labels displaying general-level health claims (24.2%) were beverages low in sugar. Only 8.2% and 5.2% of labels displaying nutrition content claims and un-regulated claims respectively were from beverages low in sugar.

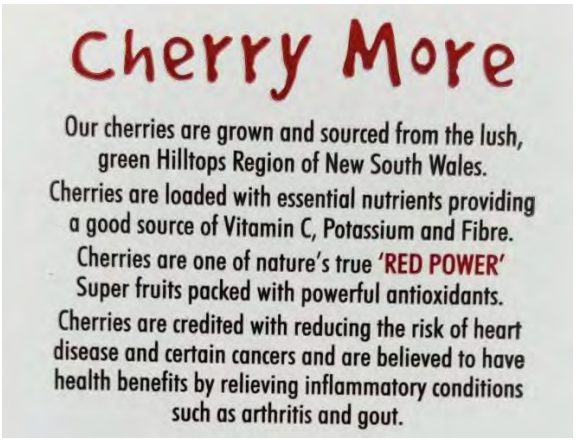
One product contained a high-level health claim and, given the strict requirements for displaying such claims, this product and claim was further investigated (Figure 4.3.1). The claim was subsequently deemed un-substantiated and therefore in violation of the FSANZ Code. The claim was reported to the appropriate state-based regulatory body and has since been removed from the offending product (Figure 4.3.1).

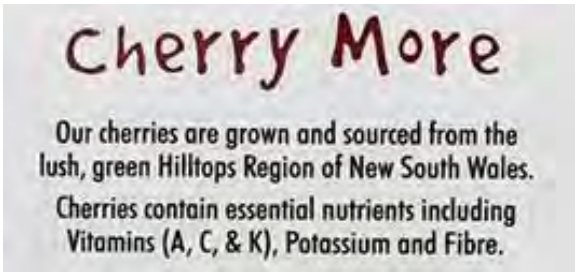
Table 4.3.1. Comparison of Health and Nutrition Content Claims Regulated by FSANZ Code and unregulated better-for-you features on sugary beverage labels: South Australian supermarkets (n=17), September – November 2016**

	No. of Beverages (n=945)	Proportion of Beverages, %	Low Sugar (1≤2.5g/100ml), %*
High-level health claim	1	0.1%	0%
General-level health claim	35	3.7%	24.2%
Nutrition content claim	597	63.2%	8.2%
Un-regulated features	800	85.0%	5.2%
Combined health/nutrition content claims and un-regulated features	571	60.0%	7.9%

*Reported as percentage of beverages within claim category, N=941 as 4 beverages contained missing reporting of sugar content. Low sugar is categorised based on FSANZ Code requirements for making low-sugar claims on package.[140]

** Excluding fruit or vegetable features





A, High-level health claim present (2016) B, High-level health claim removed (2019)[243]

Figure 4.3.1. Unsubstantiated use of high-level health claim on sugar-containing beverage (Cherry More, Cherry Juice[244])

4.3.2 Discussion of regulated health and nutrition content claims

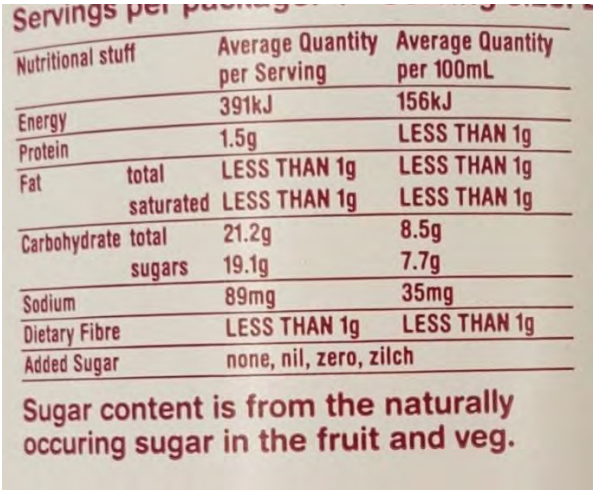
The FSANZ Code has the potential to prevent the use of health-related claims on unhealthy products such as beverages high in sugar. The results from this supplementary analysis show that most sugar-containing beverages display health-related claims and features not captured by the FSANZ Code. The results further show that use of health-related claims on the labels of sugar-containing beverages decrease when they are subjected to more restrictive regulation by the FSANZ Code. This is demonstrated by the relatively low use of health claims, which can only comprise pre-approved claims and can only be applied to products meeting the nutrient profiling score criterion,[114] compared to nutrition content claims which are not subjected to these additional measures. Previous research suggests that consumers do not differentiate between the different types of claims on labels.[132, 143, 144] Therefore, to better prevent misleading health-related claims being used on the labels of unhealthy products, such as sugar-containing beverages, the nutrient profiling criteria should be applied to all products displaying any claim, not just health claims, and the FSANZ Code should be extended to capture other commonly used health-related claims/features on labels.

One product was observed to contain an un-substantiated high-level health claim. General-level health claims were not assessed for compliance with the FSANZ Code as it was not an objective of the study to assess compliance. However, the observed example highlights

another limitation of the current regulatory system—the lack of active surveillance of product labels displaying health claims. Rather, the current regulatory system requires voluntary reporting of violations from general observers. This requires the everyday shopper to understand what claims would be in violation of the code and to report un-substantiated claims. Given reporting violations of the FSANZ Code can result in the removal of unsubstantiated and misleading claims, active surveillance of health and nutrition claims on food and beverages has the potential to remove unsubstantiated and misleading claims from unhealthy products and may also act as disincentive to use them.

Sugar-related claims

A provision within the FSANZ Code also allows for the use of 'no added sugar' nutrition content claims on beverages which were found in the preceding paper to occur on over 30% of the labels of beverages that were high and very high in sugar.[219] For 'no added sugar' claims, the FSANZ Code states that the food contains no added sugars and no added concentrated fruit juice or deionised fruit juice, with the exception of non-alcoholic beverages (e.g. soft drink, electrolyte drinks, juices, etc.; Schedule 4 S4-3).[245] This means that beverages containing fruit juice and concentrate, which can be high in free sugar, are able to display a 'no added sugar' claim. This finding is of particular interest given the association between free sugar consumption and adverse health effects.[14] The preceding paper also identified the use of claims referring to natural sugar and sugar from fruit. While the paper discussed use of claims anywhere on the label, further analyses found a small percentage of beverages in the sample (5.6%) were found to display these claims within or directly below the Nutrition Information Panel (see example in Figure 4.3.2). While this information is voluntary and constitutes a nutrition content claim,[246] this may not be clear to consumers when situated within the Nutrition Information Panel which is often used as an objective and trustworthy source of nutrition information.[225] Presenting these claims in this way may be misleading to consumers and may cause further confusion regarding sugar content of beverages, as consumers view 'natural' sugars as healthier than 'added' sugars in beverages.[171, 185] Although the display of 'natural' or 'fruit' sugar claims within or below the Nutrition Information Panel were observed on a small proportion of beverages in the captured sample, these sorts of claims may increase in prevalence as the focus on sugar in public and policy discussions continue.



Nutritional stuff		Average Quantity per Serving	Average Quantity per 100mL
Energy		391kJ	156kJ
Protein		1.5g	LESS THAN 1g
Fat	total	LESS THAN 1g	LESS THAN 1g
	saturated	LESS THAN 1g	LESS THAN 1g
Carbohydrate	total	21.2g	8.5g
	sugars	19.1g	7.7g
Sodium		89mg	35mg
Dietary Fibre		LESS THAN 1g	LESS THAN 1g
Added Sugar		none, nil, zero, zilch	

Sugar content is from the naturally occuring sugar in the fruit and veg.

Average Quantity	Per 100mL
Energy	122kJ
Protein	1.0g
Fat - Total	<0.1g
- Saturated	<0.1g
Carbohydrate	6.6g
- Sugars*	6.4g
Sodium	10mg
Dietary Fibre	0.1g

Nutritional values may vary slightly due to natural seasonal changes.
* Occur naturally, not added.

A, Nudie, Veggie Nudie Juice[247] B, Impressed Juices, Summer Greens Juice[248]

Figure 4.3.2. Naturally occurring sugar claims displayed in conjunction with the Nutrition Information Panel on juice labels (2016)

Findings from this study regarding use of sugar-related claims were used in a submission to the public consultation of the labelling of sugars on packaged food and drinks in 2018.[249] The findings were subsequently cited in the resulting policy paper,[250] supporting the position that some manufacturers voluntarily display added sugar information in their Nutrition Information Panel and make claims pertaining to the product being naturally sweetened with sugar from fruit. This suggests that if manufacturers can calculate this information for the purpose of using such claims, they can also do so for the reporting of mandatory added sugar labelling in their Nutrition Information Panel.

4.4 Health Star Rating system

The Health Star Rating (HSR) System was also observed on sugar-containing beverage labels during the preliminary coding for Study 1. The HSR System is a voluntary front-of-pack interpretive labelling system that was introduced to Australia and New Zealand in 2014.[251] Although development of the system was led by the Australian Government in consultation with a number of stakeholders, it is predominantly left to food manufacturers to use responsibly and accurately.[252] Given the aim of the HSR System is to guide consumers in their assessment of healthfulness of food and beverage[252] and, similar to health and nutrition claims, can be used at the manufacturers discretion in its current voluntary nature, it was considered within the scope of this research project. The following article provides an analysis of the use of the HSR System on sugar-containing beverage labels.

Statement of Authorship

Title of Paper	Health Star Ratings: What's on the labels of Australian beverages?
Publication Status	☑ Published ☐ Accepted for Publication ☐ Submitted for Publication ☐ Unpublished and Unsubmitted w ork w ritten in manuscript style
Publication Details	Brownbill AL, Braunack-Mayer A, Miller C. Health Star Ratings: What's on the labels of Australian beverages? Health Promot J Austr. 2019;30(1):114-18.

Principal Author

Name of Principal Author (Candidate)	Aimee Lee Brownbill		
Contribution to the Paper	Conceptualised and designed study, developed coding tool, collected and analysed data, drafted manuscript, reviewed and revised final manuscript, acted as corresponding author.		
Overall percentage (%)	85%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	13.03.2020

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);

ii. permission is granted for the candidate in include the publication in the thesis; and

iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Professor Annette Braunack-Mayer		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study, coding tool and data analysis. Reviewed manuscript.		
Signature		Date	13.03.2020

Name of Co-Author	Professor Caroline Miller		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study, coding tool and data analysis. Reviewed manuscript.		
Signature		Date	13.03.2020

4.5 Health Star Ratings: What's on the labels of Australian beverages?

4.5.1 Abstract

Issue addressed: The Health Star Rating (HSR) System provides a useful tool to communicate health and nutrition messages to consumers. Given the large contribution from sugar-containing beverages to sugar intake in the Australian diet and the adverse health outcomes associated with frequent consumption, it is important to investigate how the HSR System is displayed on beverages. Our research measured and compared the presence of the HSR System on the labels of sugar-containing and sugar-free beverages in Australia.

Methods: We conducted a survey of the labels on 762 ready-to-drink (≤600ml) non-dairy/non-alcoholic beverages, sampled from 17 South Australian supermarkets in late 2016. We measured the presence of a star rating icon or an energy-only icon (which is an option of the HSR System for beverages).

Results: The HSR System was observed on 35.3% of beverages, with only 6.8% displaying a star rating icon and 28.5% displaying an energy-only icon. When present (n=52), star rating icons were almost universally 5-stars (94.2%), and of these, they were predominantly displayed on 100% juices (85.7%). Almost all beverages with a star rating contained high amounts of sugar; only 3 sugar-free beverages displayed a star rating.

Conclusions: We found that there is low uptake and limited use of the HSR System on beverages.

So what? The HSR System on beverages could better achieve its objectives if: the energy-only icon were removed from the graphic options; the algorithm were adjusted so that 100% juices cannot display a 5 star rating; and the System were made mandatory.

4.5.2 Introduction

Introduced to Australia in 2014, the Health Star Rating (HSR) System is a voluntary front-of-package labelling system that aims to assist consumers in making healthier food choices.[253] The System uses an algorithm to derive a score, displayed in the form of a 'star rating', that ranges from 0.5-stars (indicating the least healthy) to 5-stars (indicating the healthiest option).[253] The System has five graphic options,[253, 254] four of which incorporate a star rating icon (Figure 4.5.1a). The fifth is an energy-only icon (Figure 4.5.1b) permitted 'for small pack sizes and some confectionery and beverage products'.[253] Plain packaged water is exempt from using the algorithm and receives an automatic 5 star rating.[253]

A, Star rating icon B, Energy-only icon

Figure 4.5.1. Health Star Rating System graphics

Research on the HSR System has predominantly focused on its effectiveness compared to other front-of-pack labelling systems[255-257] and modelling of the star ratings that can be displayed on products if the manufacturer chooses to do so,[258, 259] rather than real world observations of use of the System in retail settings.[251, 258] A study by Lawrence et al[258] examined how the display of the HSR System differed between core and discretionary foods.[258] This research only reported the display of the System on water and not across the entire beverage category.[258] Further, a 2015-16 progress review on the HSR System reported lower uptake on beverages than foods.[251] Lower uptake of the System for beverages may be due to the discretionary nature of most beverages, which would result in a low number being able to score a favourable high star rating. The progress review did not distinguish between the use of the System on sugar-containing compared to sugar-free beverages and

did not measure the presence of the energy-only icon on beverage labels.[251] Gaps therefore remain in our understanding of the current use of the HSR System on beverages in Australia.

Given the significant role sugar-sweetened beverages play in contributing excess free sugar to the Australian diet,[15] and risk to metabolic[50] and dental health,[52] investigation of the use of the HSR System on beverages is warranted. This study aimed to measure the presence of the HSR System on beverage labels. We sought to compare the presence of the System on sugar-containing and sugar-free beverages and the use of the star rating icon compared to the energy-only icon. Sugar-containing beverages include beverages with both 'added' and 'free' sugars (i.e. sugar from 100% juice) which the World Health Organization recommend limiting due to their contribution to excess energy intake and increased risk for non-communicable diseases.[14]

4.5.3 Methods

We conducted a survey of the labels on packaged non-dairy/non-alcoholic beverages (defined as Category 1 Beverages for the HSR System)[260] between September and November 2016. Alcoholic beverages were excluded as they are prohibited from displaying the HSR System. Dairy beverages are categorised separately in the HSR System as they contain macronutrients that substantially alter their nutrient profile compared to other beverages and use of the HSR System on dairy beverages has previously been documented.[261] We therefore excluded dairy beverages from the study.

We limited our sample to beverages that were ready-to-drink (RTD; defined as ≤600ml in volume). Non-English packages and duplicates were excluded. Multiple package sizes of the same product were also excluded after preliminary analyses found no difference in labels across package sizes. The method of data collection was based on similar studies.[113, 160, 230] The sampling frame was 17 South Australian stores purposefully selected from 4 leading Australian supermarket chains across different geographical and socio-economic areas.[229] Beverage labels were photographed in store. The study was granted an exemption from Human Research Ethics Committee review.

The final sample was 762 RTD beverages. Beverages were coded for type of beverage (*Alcohol substitute [i.e. sparkling apple or grape juices with 'non-alcoholic' displayed on the*

front of label], coconut water [flavoured or plain], energy drink, fruit drink, iced tea, juice [100% juice separated], soft drink, sports drink, flavoured water [still or sparkling], and other) and categorised as either sugar-free (<1g/100ml) or sugar-containing (≥1g/100ml). Sugar-containing beverages were further categorised by sugar content. Although categories for sugar content of beverages have previously been defined for use with front of pack nutrition labelling,[262, 263] we defined sugar categories conservatively to align with recommendations for free sugar intake made by the World Health Organization.[14] Sugar content was categorised as low-sugar (≥1 and ≤2.5g/100ml),[140] medium-sugar (>2.5 and <5g/100ml), high-sugar (≥5g/100ml and <10g/100ml) and very high-sugar (≥10g/100ml). The presence of a star rating icon or the energy-only icon was recorded. Descriptive analyses were undertaken.

4.5.4 Results

Of beverages surveyed, 35.3% displayed the HSR System on their label (Table 4.5.1). It was more common for beverages to display the energy-only icon (28.5%) than a star rating icon (6.8%). Overall 24% of sugar-free beverages (n=129) displayed the energy-only icon, and 2.3% displayed a star rating icon. Similarly, 29.4% of sugar-containing beverages (n=633) displayed the energy-only icon while 7.8% displayed a star rating icon. For sugar-containing beverages, 69% of energy drinks (n=29), 62.5% of non-carbonated flavoured water (n=8) and 55.2% of sports drinks (n=29) displayed the energy-only icon.

When a star rating icon was present (n=52), beverages universally displayed either a 5 star rating (94.2%) or a 4.5 star rating (5.8%). Of these beverages, 3 were no-sugar waters, 1 was low-sugar (1 plain coconut), 3 were medium-sugar (flavoured coconut waters), and the remaining 45 beverages were 100% juices, with either high- (68.9%) or very-high (31.1%) sugar content.

Table 4.5.1. Health Star Rating (HSR) System on ready-to-drink (≤600ml) beverages

		Sugar-Free Beverages				Sugar-Containing Beverages				Sugar Content (g/100ml) of Beverages with 5 Star-Rating Icon				
Beverage Type	n	n	No icon %	Energy-Only Icon %	4.5 or 5 Star-Rating Icon† %	n	No icon %	Energy-Only Icon %	5 Star-Rating Icon† %	n	Low-Sugar (≤2.5) %	Medium-Sugar (>2.5<5) %	High-Sugar (≥5<10) %	Very High-Sugar (≥10) %
Juice, 100%	**177**	**0**	0	0	0	**177**	59.9	14.7	25.4‡	**45**‡	0	0	68.9	31.1
Soda	**143**	**14**	57.1	42.9	0	**129**	58.1	41.9	0	**0**	0	0	0	0
Iced Tea	**86**	**8**	75.0	25.0	0	**78**	62.8	37.2	0	**0**	0	0	0	0
Fruit Drink	**64**	**0**	0	0	0	**64**	81.3	18.8	0	**0**	0	0	0	0
Water, Flavoured Mineral	**48**	**13**	53.8	46.2	0	**35**	57.1	42.9	0	**0**	0	0	0	0
Energy Drink	**41**	**12**	41.7	58.3	0	**29**	31.0	69.0	0	**0**	0	0	0	0
Sports Drink	**38**	**9**	66.7	33.3	0	**29**	44.8	55.2	0	**0**	0	0	0	0
Water, Plain Still	**34**	**34**	91.2	5.9	2.9	**0**	0	0	0	**1**	100	0	0	0
Juice	**30**	**1**	100.0	0	0	**29**	82.8	17.2	0	**0**	0	0	0	0
Water, Flavoured Still	**29**	**21**	85.7	4.8	9.5	**8**	37.5	62.5	0	**2**	100	0	0	0
Coconut Water, Plain	**24**	**0**	0	0	0	**24**	83.3	12.5	4.2	**1**	100	0	0	0
Coconut Water, Flavoured	**21**	**0**	0	0	0	**21**	81.0	4.8	14.3	**3**	0	100	0	0
Water, Plain Sparkling	**17**	**17**	76.5	23.5	0	**0**	0	0	0	**0**	0	0	0	0
Alcohol Substitute	**5**	**0**	0	0	0	**5**	100.0	0	0	**0**	0	0	0	0
Other	**5**	**0**	0	0	0	**5**	100.0	0	0	**0**	0	0	0	0
TOTAL	**762**	**129**	73.6	24.0	2.3	**633**	62.9	29.4	7.8	**52**	7.7	5.8	59.6	26.9

†Only 4.5 and 5 star-rating icons were displayed on beverages.

‡3 beverages (6.7%) had a 4.5 rather than 5 star-rating icon.

4.5.5 Discussion

Our findings highlight gaps and missed opportunities in Australia's HSR System with practical implications for our System and other countries looking to adopt like systems. Only beverages within the RTD category that were able to score the highest health star ratings of 4.5 and 5 stars displayed the star rating icon on labels. This is much higher than the 1.5 average star rating that beverages would receive if the System were universally adopted or compulsory.[259] It also differs from the wide range of star ratings (0.5-5 stars) that have previously been observed across the whole beverage category in New Zealand, that is, including larger 'sharing' size bottles.[251] These differences may be the result of differing methodology. Unlike our study, the NZ sample included larger sized packages, including store-brands known to have adopted the HSR universally.

Given that the HSR System aims to guide consumers in making healthier choices,[251] it is concerning that the System is used more frequently on sugar-containing beverages than on un-flavoured waters. Only 1 of 51 un-flavoured waters displayed a 5 star rating, despite all being eligible to do so. This appears to be a missed opportunity on behalf of water manufacturers.

We also found that almost 1 in 4 (24%) 100% juice beverages displayed a 5 star rating on labels. The eligibility for 100% juices to score a 5 star rating has previously been highlighted as an anomaly of the System.[258] While it can be argued that 100% juices are included in the current Australian Dietary Guidelines, which state 125ml may contribute to a serve of fruit 'occasionally',[264] the current HSR scoring that allows 5 stars on a 600ml RTD bottle of juice likely to be consumed in one sitting does not align with these recommendations.[258] Further, given that both plain bottled water and 100% juices are eligible to display a 5 star rating icon, the System is not clearly communicating the Guideline recommendations to limit juice consumption and choose water.[264] Such scoring may act to reinforce perceptions that 100% juices are healthy[154, 162, 167] rather than communicating that they are high in sugar.[213]

Our results also show that beverage manufacturers are favouring the energy-only icon option of the HSR System over the star rating icon by a factor of 4 to 1. While the two-year review on the HSR System did not report the use of the energy-only icon on beverages, it reported that the energy-only icon is used less often than the star rating icon across food

products.[251] Our results indicate that this is not the case for beverages. Although use of the energy-only icon is in accordance with the current HSR guidelines, the star rating icon is considered the most useful aspect of the HSR System for guiding consumers to healthier options.[255, 256] It is therefore questionable whether the limited use of the star rating icon and the concurrent use of the energy-only icon on beverages meet the HSR System's aim of enabling direct and readily understandable comparisons between products from the beverage category.[254]

4.5.6 Limitations

It is important to note that our study is limited to the beverages available for sale at the time of the survey within our sampling frame (September to November 2016). The consumer market evolves constantly and new beverages will become available and label designs will change. Further, while we have measured the presence or absence of the HSR System, we have not assessed how this influences consumers' interpretation or choice of beverages.

4.5.7 Conclusion

We found that there is low uptake of the HSR System on beverages in Australian supermarkets. Firstly, only beverages that can score a high star rating displayed a star rating icon on labels, and many do so despite containing large amounts of sugar. Conversely, most sugar-free beverages, including waters, are not taking the opportunity to display a star rating icon. Making the HSR System mandatory so that all beverages are required to display the System would address this skew. Secondly, a number of 100% juices are displaying a 5 star rating. The HSR System's scoring for beverages should be adjusted so that 100% juices which are high in free sugar will not receive a 5 star rating, and this rating should be reserved for the healthiest beverage option, water. Lastly, beverage manufacturers often choose to display the energy-only icon over the star rating icon. Given that the star rating icon is the most useful element of the HSR System and the energy-only icon is not comparable to the star rating, the energy-only icon should be removed as an option from the HSR System.

4.5.8 Post-script

Findings from this study were used in submissions to the public consultation of the five-year review of the HSR System.[265-267] The findings were subsequently cited in the resultant consultation papers and recommendations for improving the Health Star Rating System.[268-270] This research helped inform the recent policy decision by the Australia and New Zealand Ministerial Forum on Food Regulation to remove the option within the HSR System that permit the display of beverages and confectionary to display an energy icon alone in place of the star rating icon, and, to improve the scoring of beverages so that beverages high in sugar will no longer receive a 4.5 or 5 star rating.[271]

Chapter 5: Analysis of sugar-containing beverages currently advertised on television

5.1 Chapter outline

This chapter presents Study 2 which aimed to answer the research question: *what messaging is presented in television advertisements of sugar-containing beverages that associate these products with health?* To address this research question, I used a multi-modal discourse analytical approach to analyse the messaging within current television advertisements of sugar-containing beverages.

As discussed in Chapter 3, television advertisements are a complementary form of product marketing to sugar-containing beverage labels; including them in this thesis allows for the analysis of potentially different health-related marketing messages. The analytical methods used and the adoption of a broad conceptualisation of health allowed me to develop a more comprehensive understanding of health-related marketing of sugar-containing beverages. Given little research has observed health-related marketing of sugar-containing beverages through television, and that which has been done has used content analysis, this study further informs the literature on this topic.

The research is presented in the form of a peer-reviewed publication.[272]

Statement of Authorship

Title of Paper	Selling function: The advertising of sugar-containing beverages on Australian television.
Publication Status	☑ Published ☐ Accepted for Publication ☐ Submitted for Publication ☐ Unpublished and Unsubmitted w ork w ritten in manuscript style
Publication Details	Brownbill AL, Miller CL, Smithers LG, Braunack-Mayer AJ. Selling function: The advertising of sugar-containing beverages on Australian television. Health Promot Int. 2020. daaa052.

Principal Author

Name of Principal Author (Candidate)	Aimee Lee Brownbill		
Contribution to the Paper	Conceptualised and designed study, analysed data, drafted manuscript, reviewed and revised final manuscript, acted as corresponding author.		
Overall percentage (%)	80%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	17.07.2020

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);
ii. permission is granted for the candidate to include the publication in the thesis; and
iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Professor Caroline Miller		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study and data analysis. Reviewed manuscript.		
Signature		Date	17.07.2020

Name of Co-Author	Associate Professor Lisa Smithers		
Contribution to the Paper	Provided scientific input regarding conceptualisation, designed data collection method, collected and provided data for use in research. Reviewed manuscript.		
Signature		Date	17.07.2020

Name of Co-Author	Professor Annette Braunack-Mayer		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study and data analysis. Reviewed manuscript.		
Signature		Date	17.07.2020

5.2 Selling function: The advertising of sugar-containing beverages on Australian television

5.2.1 Abstract

Background: Reducing population consumption of sugar-containing beverages has become a public health priority in many countries due to causal evidence between high consumption, weight gain and non-communicable diseases. This study aims to explore how sugar-containing beverages are associated with health and wellness in television advertisements.

Methods: Our sample consisted of all televised advertisements from sugar-containing beverage manufacturers aired on free-to-air television from one Australian network (four channels) in 2016 (n=30 unique advertisements). We transcribed advertisements for audio and visual information. We analysed data inductively using methods from thematic, discourse and multi-modal analysis.

Results: Advertisements for sugar-containing beverages reflected both traditional (physical health and reduced risk of disease) and broader (wellbeing) conceptualisations of health. Beverages were positioned in advertisements as contributing a functional role to promote and enhance health and wellbeing within the physical, mental and social domains. Beverages were advertised as correcting suboptimal states of being to achieve desirable outcomes, including relaxation, increased resistance to disease, enhanced performance, better cognitive functioning and improved social connections.

Conclusion: Positioning beverages within a wider conceptualisation of health and wellbeing aligns with how health and nutrition are increasingly being understood and sought out by consumers, creating increased opportunities for the marketing of sugar-containing beverages as 'healthy'.

5.2.2 Introduction

Reducing consumption of sugar-containing beverages is widely acknowledged as a public health priority.[19] Frequent consumption of sugar-containing beverages is associated with weight gain, obesity and adverse health outcomes such as type II diabetes,[37, 48] dental caries[50] and increased risk of cardiovascular disease.[52] Consumption of sugar-containing beverages is high globally[213] and governments are increasingly implementing measures to reduce population consumption, for example, through taxes on sugar-containing beverages[273] and social marketing campaigns.[106]

With expanding scientific evidence and the implementation of public health measures to reduce population consumption of sugar-containing beverages, it is unsurprising that consumers have become increasingly concerned about sugar. The United Kingdom Food Standards Agency found sugar to be the highest food concern for consumers in the 2018 Public Attitudes Tracker population survey.[103] In the survey, concern about sugar rose more than any other food-related concern and surpassed price as the top concern in 2018 compared to 2010. Consumer concern about sugar content has also been documented by marketing research companies (e.g. in the United States[102] and Australia[101]). Furthermore, consumer market analysts are linking consumer concerns about sugar, and health and wellness more broadly, to the increased sales of beverages using health and wellness marketing.[274]

Manufacturers use health and nutrition claims when marketing foods and beverages to influence purchasing and consumption behaviour.[123, 135] Many governments regulate the use of health and nutrition related claims, which are often defined as explicit claims related to the nutrients present within products and nutrient-health relationships.[275] However, it is less common for countries to regulate marketing techniques that promote more general concepts of health and wellbeing despite this type of marketing being common for discretionary (non-core) food and beverage products.[118, 141, 219] For example, marketing techniques more implicitly addressing health and wellness may include the positioning of products as being natural, functional and/or generally better-for-you than other products.[276] Associating discretionary products, such as sugar-containing beverages, with health and wellness can create a 'health halo' for these products, making them appear healthier than they are or would otherwise be perceived.[145, 146, 277]

Previous research has found that it is common for sugar-containing beverages to be associated with health and wellness through claims and images on their labels.[219] In this study, we seek to explore further how sugar-containing beverages are associated with health and wellness in television advertising. Doing so will provide further insight into the marketing of health and wellness as associated with sugar-containing beverages that goes beyond assessing the presence of health and nutrition claims which are narrower in scope.

5.2.3 Methods

We qualitatively analysed television advertisements to explore in-depth how sugar-containing beverages are marketed in relation to health and wellness. We drew on methods from thematic,[214, 217] discourse[278, 279] and multi-modal analysis[280] to examine what was being presented (the message), how it was being presented (the rhetorical or persuasive devices) and why (the purpose this message may serve).

Theoretical and analytical framework

In this paper we took a social constructionist approach. We acknowledge through this approach that the ways in which viewers experience and interpret advertisements are shaped both by the advertisement and by wider social forces. Therefore, we drew on the literature about how broader societal forces are referenced in the advertisements to suggest what messaging and meanings are given preference in the way the advertisements are presented.[215, 278, 280]

In our analysis we considered both the subject matter and rhetorical devices used within advertisements and the way in which these address or reproduce current ideologies.[281] We used thematic analytical methods to analyse the messages that were presented within advertisements and why these may resonate with viewers. Drawing on discourse analytical methods allowed us to analyse the language and imagery in advertisements to display how meaning is negotiated and constructed.[279] In particular, it allowed us to analyse the rhetorical or persuasive devices within the advertisements, that is, how the message was being sold and why it may resonate with viewers. As we were working with television advertisements, we employed a multi-modal method which considers both audio (i.e. speech and other sounds) and visual (i.e. text and images on screen) information as language

to analyse the way these features worked in conjunction to communicate and strengthen a message.[280]

Data sample

Our sample frame included all televised advertisements containing beverages broadcasted between January and December 2016 on one free-to-air network (one of four major commercial networks) comprising four channels in South Australia. Detailed information regarding data collection and the dataset of food and beverage advertisements broadcasted on this network during this time frame (N=778,475) are reported elsewhere.[282] Illustrated in figure 5.2.1, of the 893 unique food and beverage advertisements broadcast, 50 contained beverages. We excluded advertisements produced by retailers (e.g. supermarkets) and only analysed advertisements that were produced by the manufacturer, therefore exclusively advertising the beverage product. We also excluded advertisements that contained only non-sugar varieties of beverages. Our final sample consisted of 30 unique sugar-containing beverage advertisements. The advertisements were for the following beverage types: soft drinks, flavoured milk beverages (including milk additions, i.e. Milo), sports drinks, energy drinks, and iced tea. No ethical approval was required for this study.

Data analysis

AB imported advertisements into NVivo 11[283] and transcribed the text, oral/audio, and visual information of advertisements. AB familiarised themselves with the data by repeatedly viewing the advertisements and reading transcripts while making descriptive notes, developing a sense of each advertisement alone and in relation to each other. AB inductively coded the data and analysed codes for common representations, meanings and values represented across or between beverage advertisements.

The coding and analysis process was iterative and included continued consultation between authors.[214, 217] We explored and identified themes at the latent level through contextualising our observations within the wider literature. This allowed us to develop a sense of the dataset as a whole and consider all aspects of the advertisements before considering which (if any) aspects of the advertisements associated sugar-containing beverages with health and wellness.

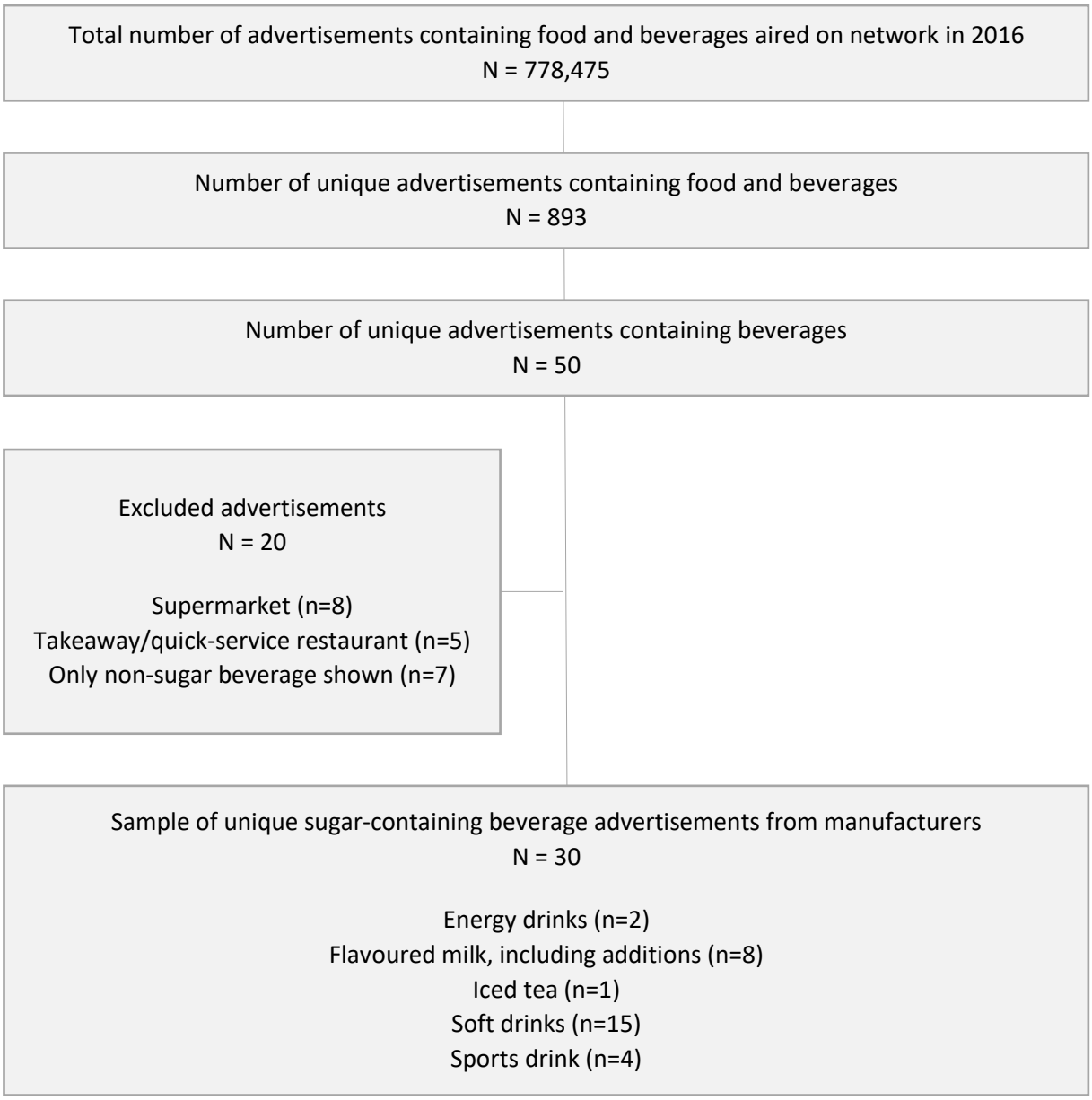


Figure 5.2.1. Sample selection of televised sugar-containing beverage advertisements broadcast between January and December 2016 on a major free-to-air network in South Australia

5.2.4 Results

We observed health and wellness related themes in 25 of the 30 advertisements (energy drink n=2, flavoured milk n=7, iced tea n=1, soft drinks n=11, sports drink n=4). Below we illustrate and discuss the messaging and persuasive devices present in the advertisements and how they may function to associate sugar-containing beverages with health and wellness. Based on our observations we have divided our results into two sections: health and wellbeing in advertisements to reflect health and wellness related messaging; and

persuasive devices across the advertisements which demonstrate how a persuasive argument is constructed to sell this messaging (illustrated in figure 5.2.2). Throughout we discuss the purpose these observations may serve and how they may resonate with viewers.

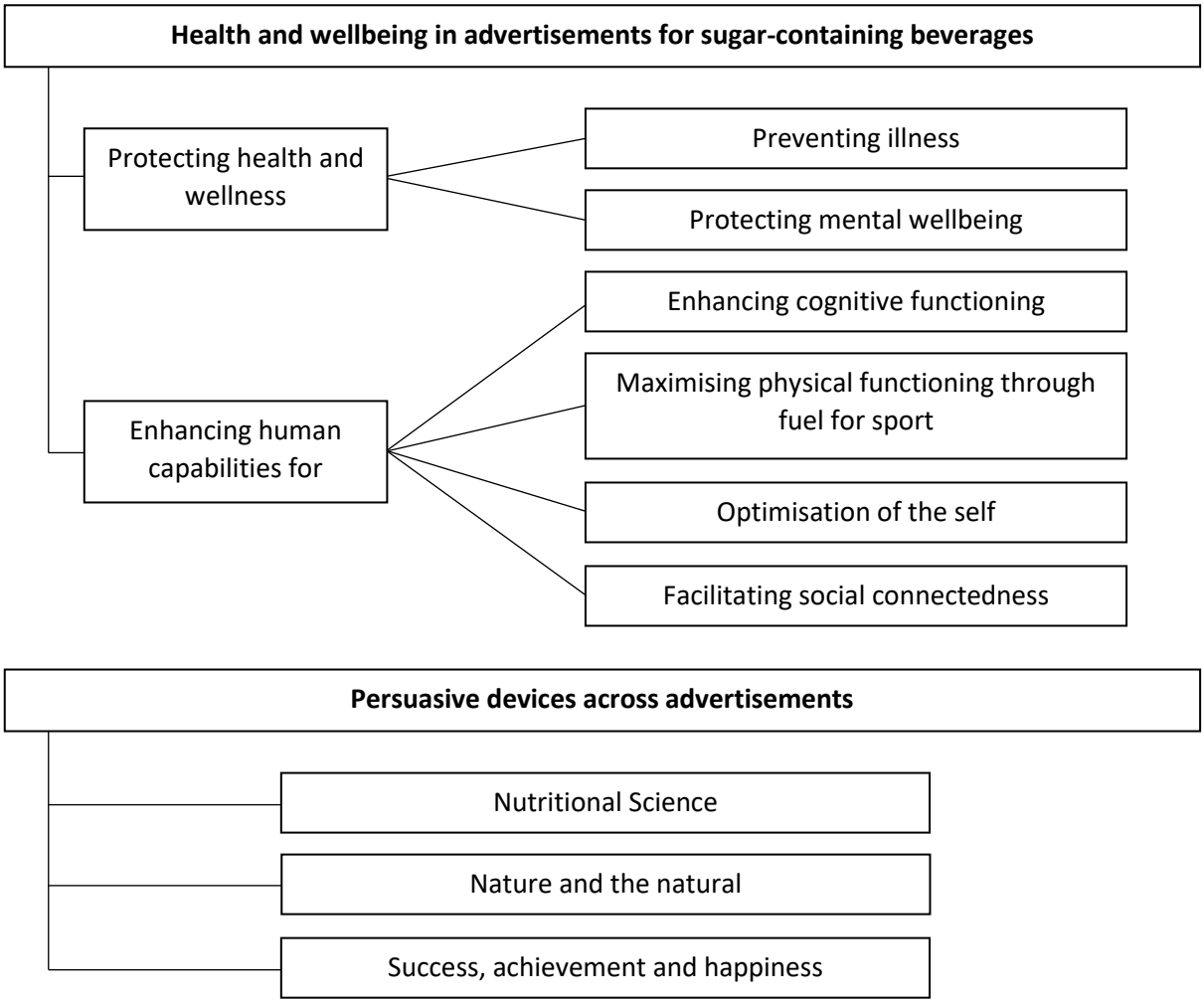


Figure 5.2.2. Thematic map of results

Health and wellbeing in advertisements for sugar-containing beverages

Advertisements presented sugar-containing beverages as contributors to physical and psychosocial health and wellness. We identified two overarching discourses relating to health and wellness in advertisements: a discourse of protecting health and wellness and a discourse of enhancing human capabilities. We describe these discourses below based on their dominant positioning in advertisements although they were not mutually exclusive in each advertisement.

Protecting health and wellness

Advertisements constructed a discourse of protecting health and wellness through the positioning of beverages as contributing to illness prevention and mental wellbeing. These advertisements encouraged viewers to consume the beverages to help maintain their health and wellbeing.

Preventing illness

Probiotic beverage Yakult was advertised as a preventive measure to protect consumers' health. In the first of two advertisements, the digestive system needed protecting (excerpt 1), and in the second advertisement there was a broad reference to 'protecting the future you' alongside a reference to Yakult as 'the healthy family drink'. However, neither advertisement made it clear what the viewers' health, or digestive system, need protecting from. Rather, the advertisements alluded ambiguously to a threat to health. Set within a broader health conscious society, this may stimulate or target pre-existing health anxieties about minor bodily symptoms.[284, 285] In excerpt 1, particularly, the beverage was a type of 'functional food' equating food to medicine.[286] Overall, the advertisements encourage the viewer to assess their health and take protective measures against illnesses that may (or may not) eventuate.

Excerpt 1. Yakult

Woman on screen appears with credentials 'BApplSc, Grad Dip Diet, APD'. She explains: "This is Doctor Minoru Shirota. More than 80 years ago, he began researching the role of beneficial bacteria in the digestive system. His research led him to discover a unique bacteria that survives the journey through the digestive system. That's why Yakult is the only probiotic drink that contains the Shirota strain. And that's why, every day, somewhere in the world, more than 30 million people drink a bottle of Yakult…"

Protecting mental wellbeing

Real Iced Tea Co. was advertised as a product to help an individual find peace and relaxation in an otherwise busy world. The advertisement showed a woman "unwinding" in a garden while consuming the beverage (excerpt 2). The tranquillity of the natural environment was contrasted with the buzz of an urban environment as the camera panned out to show the garden was a small patch located within a city. The advertisement suggests that, by consuming the product, an individual can create their own sense of peace and calmness to detach themselves from a busy world. The notion of actively seeking relaxation has similarly been recommended in popular media discourse as a means of promoting wellbeing through helping busy individuals to unwind and counterbalance the stresses of modern living.[287]

Excerpt 2. Real Iced Tea Co

A woman is laying in a garden patch; there are sound of birds chirping and uplifting guitar chords. The camera pans out to reveal the garden patch is located within a city. A woman's gentle voiceover says: "Unwind with the naturally brewed tea leaves of real iced tea. Brewed to hit the spot."

Enhancing human capabilities for health and wellness

Advertisements constructed a discourse of enhancing human capabilities for health and wellness through positioning beverages as: enhancing cognitive functioning; maximising physical functioning through fuel for sport; optimising the self; and facilitating social connectedness. These advertisements encouraged the viewer to consume the beverages to help develop an enhanced or optimised state of health and wellness.

Enhancing cognitive functioning

Dare Iced Coffee was presented as enhancing the cognitive functioning of consumers. The advertisement in excerpt 3 portrayed a man struggling to navigate domestic responsibilities (i.e. minding young child, grocery shopping and pet-walking) as he had unknowingly mistaken his pet, shown in his baby carrier, for his child who stands beside him. The advertisement implies that Dare Iced Coffee is the remedy to lapses of concentration when the man is shown in the closing scene carrying his child rather than his pet while drinking the iced coffee. The depiction of a man undertaking domestic responsibilities, which have historically been considered the role of women, may function as a point of reference to changing culture and increasing responsibilities which contribute to the currently busy or '*always on'* culture. In this regard, the advertisement is similar to that for Iced Tea Co (excerpt 2) which also addresses the busy individual. However, whereas the iced tea provides a retreat from busy everyday life, the iced coffee is advertised to switch consumers on to function more effectively in everyday life. In this sense, Dare Iced Coffee was associated with enhanced cognitive functioning so that consumers can competently navigate increasing and competing responsibilities in a culture where an individual is always expected to be performing.

Excerpt 3. Dare Iced Coffee

A man is shown with a dog in a baby carrier while a toddler stands beside him. Male voiceover: “Uh oh, Dave’s got his fur child mixed up with this real child.” The final scene shows Dave drinking a Dare iced coffee, carrying the toddler in the carrier as the voiceover asserts: “A Dare fix’ll fix it.”

Maximising physical functioning through fuel for sport

Sport drinks were advertised as a source of nourishment to maximise functioning during sport. Advertisements for sports drinks commonly made references to the product as fuel, either through direct or indirect references (e.g. excerpt 4 and excerpt 5). Narratives and imagery both implied the beverage is a source of fuel or nourishment. For example, exhausted athletes being able to continue with their sport after consuming the beverage (e.g. excerpt 5), or the beverage flowing through to the body’s muscles (except 4). Advertisements also contained salient messaging that associated sweating with a loss of electrolytes. One way this was achieved was through close-up imagery focused on sweat paired with loss-framed messaging (e.g. “you lose more than just water” in excerpt 4 and “electrolytes lost in sweat” in excerpt 5). This problematizes sweating as a creating a deficit and potentially extends this ‘problem’ to physical activity more broadly. It may also function to defend the place of sport drinks during exercise, as it inherently counters an argument for water as the best beverage option during exercise. In so doing, the advertisements suggested, firstly, that ‘fuel’ is required during exercise, and secondly, that there is a right source of fuel, specifically, one containing electrolytes.

Excerpt 4. Gatorade

A translucent body is shown drinking Gatorade, the fluorescent liquid is show traveling through to the body's muscles. A male voiceover explains: "When you sweat, you lose more than just water. Gatorade rehydrates, replenishes and refuels what's lost in sweat; to perform your best."

Excerpt 5. Powerade

A famous rugby player is playing rugby in a stadium. He is tackled roughly to the ground. A close-up shows him on the ground dripping in sweat. He gets up, panting, and he is brought a bottle of Powerade which he guzzles. As he runs, periodic table symbols 'Ca, calcium', 'K, potassium', 'Mg, magnesium', 'Na, sodium' are shown on the ground, lighting up where he treads. Other players are shown falling to the ground as they attempt to tackle him. He then goes on and scores a touchdown. Throughout the advertisement, a male voiceover states: "New Powerade Ion 4. Formulated with 95% more electrolytes to help replace four of the electrolytes lost in sweat. The science of winning."

Milo was similarly situated as providing a source of nourishment during children's sport. The two advertisements observed for Milo followed a similar narrative in which early adolescents (boys in one advertisement and girls in the other, excerpt 6) train relentlessly for their sport. The advertisements overlayed images of Milo with a direct verbal reference

to Milo as fuel. The repetitive sequencing within the advertisements presented Milo as part of a ritual in training for sport, implying that it is integral to the children's eventual sporting success. The advertisements also presented the beverage as providing nutrition to children more broadly. This is evident in the sequencing of imagery which included consumption of Milo throughout the day (e.g. at home and school) and the emphasis on early adolescence as a key life stage in which nutrients (in Milo-milk) are needed to support growth and development.

Excerpt 6. Milo

The advertisement sequences scenes of a child practising for their sport, in leisure time with teammates, consuming milo [at training, school and home], and missing a goal to correspond with a child's voice over stating: "My training. My squad. My fuel. My bad [repeated 3 times]." On the fourth sequence the child scores the goal and instead of "my bad", an adult voiceover states: "Milo. Nutrition to help fuel their inner champion."

Optimisation of the self

Sport and energy drinks were positioned as aiding the consumer to optimise themselves. In sport drink advertisements, this related to sporting success as discussed above. The message was constructed through the depiction of the sports drink enhancing sporting performance of athletes who are acknowledged as national sporting champions (Powerade and Gatorade) and global sporting heroes (Gatorade). In the advertisements for V Energy Drink, this message was constructed through the narrative of protagonists who assume they are the best at a certain skill, then shown to be outperformed by a character identical to themselves but consuming the beverage (e.g. excerpt 7). While advertisements for sport drinks focused

on sporting performance, advertisements for V Energy Drink did not address a specific function or skill. Rather, the advertisements alluded to a general sense of optimising the self. This may be seen to align with broader societal ideals of individual perfectibility and performance whereby an individual's life in general is in need of enhancement.[288] Advertising a general optimising benefit for consumers does not suggest a specific consumption occasion. This leaves it open to interpretation for consumers to self-identify consumption occasions that best align with their own desire or perceived need for self-optimisation.

Excerpt 7. V Energy Drink

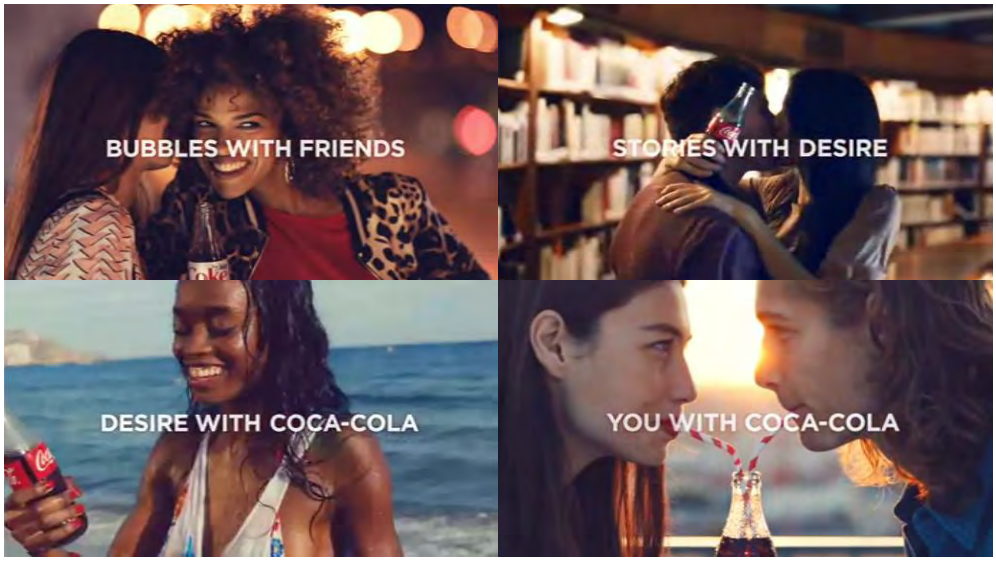
A superhero from a well-known franchise appears and proclaims: "Today we take down apocalypse!" to which he is told he is being replaced. An identical man drinking a can of V Energy Drink appears and the superhero is told that this version is "just a bit better at saving the world". The superhero shows off his superpower but is outperformed and embarrassed by his competitor. A can of V Energy Drink is shown in the closing scene and a voiceover boldly exclaims: "The massive hit, that improves you a bit."

Facilitating social connectedness

While other beverage advertisements commonly focused on the narrative of an individual, soft drink advertisements largely focused on a social narrative. Several soft drink advertisements positioned the beverage as facilitating and enhancing social connection and interaction. In the advertisements, social connectedness was illustrated through groups of people enjoying activities together as well as more intimate one-on-one relationships (e.g. excerpt 8). While soft drink advertisements have previously been documented as depicting happiness and friendships, we found that many advertisements for soft drinks went beyond

associating the beverage with these values to depict the beverage as playing an active role in facilitating social connectedness. For example, advertisements for Pepsi showed the beverage bridging language barriers to bring together people who otherwise would likely not have connected (e.g. excerpt 9). Situating the beverage at the centre of social and intimate relationships and as a facilitator to social connection may function to normalise and legitimise the place of soft drinks within everyday social situations.

Excerpt 8. Coca-Cola



In upbeat song: "No-one can stop me when I taste the feeling, nothing can ever bring me down. Taste the feeling". A sequence of scenes are shown with individuals, pairs, and groups with Coca-Cola featured in scene. Text on screen reads throughout: 'Coca-Cola with bubbles. Bubbles with friends. Friends with stories. Stories with desire. Desire with Coca-Cola. Coca-Cola with music. Music with madness. Madness with you. You with Coca-Cola. Coca-Cola with feeling. Taste the feeling.'

Excerpt 9. Pepsi

Four young backpackers are gathered in a train station. A woman is speaking French, unsuccessfully attempting to signal what she is trying to communicate to the group. Another backpacker overhears and understands; he shows the group his Pepsi can with a car icon on it. The five of them are then shown together in the back of a truck, exploring alleyways, attending a party (after being signalled by a stranger holding a Pepsi can with a party horn icon), and finally on board a train where they stand looking at a Pepsi can with an Eiffel Tower icon, smiling and nodding.

Above we have presented health and wellbeing related messaging in sugar-containing beverage advertisements and have briefly discussed some aspects of contemporary culture and values that certain advertised functions of beverages may be working to invoke. Overall, we found that sugar-containing beverages were advertised as a way to correct a suboptimal current state of being to a desired outcome (i.e. healthy digestive system, relaxation, alertness, performance, and social connection) which supports health and wellbeing within a broad conceptualisation (i.e. physical, mental and social health and wellbeing).

Persuasive devices across advertisements

In this section, we will discuss common themes we identified across the various forms of health and wellness described above. Our focus is on why it is that consumers may be particularly responsive to these messages.

Nutritional Science

Advertisements for Yakult and sport drinks heavily referenced nutritional science to create persuasive power through the presentation of the beverages as nutritionally functional. The advertisements achieved this using nutritional experts, nutritional concepts and scientific symbolism. The Yakult advertisement uses a dietitian presenter whose academic credentials are shown on screen and the doctor who is credited with making the scientific discovery. In advertisements for sport drinks, scientific expertise was assumed through the nutritional concept of electrolytes as necessary for optimal sporting performance (as previously discussed above) and scientific symbolism.

Nature and the natural

Several beverage advertisements associated the beverage with nature and natural ingredients. Advertisements for Schweppes beverages provide one example of this (excerpt 10). The advertisement shows a woman collecting the ingredients of the beverage in a field of fruit trees and a forest. The advertisement contains strong imagery of nature and the presentation of the woman herself (i.e. brown hair, absence of noticeable make up and wearing a plain white cotton dress) reinforces the natural imagery. The advertisement for Real Iced Tea Co. (excerpt 2) and Coca-Cola Life both contain women of similar appearance, laying back relaxing in nature. Certain advertisements also more overtly promote the natural

ingredients of beverages. For example, the advertisement for Real Iced Tea Co. (excerpt 2) states that the beverage is made with "naturally brewed tea leaves" and shows images of tea leaves and slices of fresh fruit shown on screen. Similarly, an advertisement for Dare Iced Coffee also states that the beverage is made from "real coffee beans and rivers of real, fresh, splashy splashy milk" with imagery of milk gushing through a canal of coffee beans. Nature is commonly used in advertising to position products as intrinsically good and healthy products[234] and advertising natural ingredients is a way in which marketers can align products with popular and expert food discourse which are known to purport healthy eating as consuming 'real', 'natural' and 'whole' foods.[241]

Excerpt 10. Schweppes

A voiceover states: "So, you're thinking, 'I want the world's finest tonic water'. Well, you'll need lemons, and oranges. Take a peel, steep it, then wait, and wait some more. Next, find the cinchona tree, you'll need the bark, and... a master blender to blend it perfectly. That leaves one thing left to do...let it out". Concurrently the advertisement shows a young woman in a field of lemon and orange trees; she picks a lemon from the tree. She is then shown walking through a forest and comes across a tree which is shown with light shining down on it. A close-up of a lemon covered in condensation is shown and the screen then fills with a yellow liquid swirling, it turns clear and bubbles are shown swirling as they turn into the lid of the Schweppes bottle.

<u>Success, achievement and happiness</u>

Advertisements presented beverages as integral to success, achievement and happiness. This was often achieved with competition narratives. Advertisements associated winning with a sense of pride and boost to self-esteem through the depiction of positive body language (e.g. cheerful roar, smiling, arms outstretched victoriously) and social praise (e.g. teammates high-fiving, patting on the back). In contrast, advertisements associated losing

with dissatisfaction (e.g. slumped shoulders, closure of eyes and head tilted downward), weakness (e.g. falling to the ground), and even humiliation (e.g. the butt of the joke). Advertisements that did not have a competitive slant depicted generic portrayal of happiness linked with consumption (e.g. smiling or laughing with, or after consuming, the beverage).

5.2.5 Discussion

Given community awareness and concern regarding sugar is increasing, we aimed to explore how sugar-containing beverages are associated with health and wellness in Australian television advertisements. We found that advertisements addressed both a traditional view of health as relating to the physical body and, in some advertisements, as the absence of disease, as well as a broader conceptualisation of health extending to broader domains of wellbeing. Beverages were positioned in advertisements to play a functional role to promote and enhance health and wellness within these domains. While the advertisements do not explicitly assert that the consumption of the advertised beverages directly result in improved health and wellbeing, they do imply that consumption of the advertised beverages contribute to achieving and maintaining health promoting states of being.

Positioning beverages as functional within a wider conceptualisation of health aligns with a paradigm shift in how matters of health and nutrition are understood by consumers. Nutritionism has been the dominate ideology relating food to health in western countries since the mid-1900s.[286] Nutritionism is a reductionist approach which reduces foods to single components, drawing attention from the nutrition profile of the food as a whole.[241] The nutritionist ideology has been particularly fruitful for marketers who have promoted the health benefits of individual nutrients within foods, regardless of the food's whole nutritional profile.[241] In recent times, this has seen to the rise in the production and promotion of 'functional foods' which are marketed as enhancing and optimising health, or particular bodily functions, based on particular nutrients within foods.[286] We found that televised sugar-containing beverage advertisements mostly implied rather than explicitly promoted nutrient related health benefits.

While we found that televised sugar-containing beverage advertisements presented the ideals of a functional product that enhances and optimises the consumer, the functionality

of beverages was not limited to physical health or the role of specific nutrients in achieving functionality. Rather, we found that beverage advertisements often implied the beverages contributed to functions related to a wider conceptualisation of health and general wellbeing. Advertising food and beverages within a wider conceptualisation of health has similarly been observed in a study of health discourse in Swedish televised food advertisements.[125] Researchers have previously suggested that the food paradigm should, and is, changing from a reductionist view of food to a holistic view of food as contributing to wider wellbeing. Within the latter conceptualisation, food is consumed for physical, psychological, cultural and social reasons that affect health and wellbeing.[289] This broader conceptualisation aligns with how consumers are increasingly understanding, and marketers are increasingly advertising, the role of food in attaining health and wellbeing.[125, 289, 290]

A holistic conceptualisation of health is similarly used in wider health promotion discourse, as is reflected by the World Health Organization's definition of health as "a state of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity". Scrinis[241] suggests that the food industry has appropriated the nutritionisim paradigm, through the production and promotion of foods fortified with nutrients, which has led to a dominance of this paradigm in public discourse. Advertising food and beverages as contributing to a broader conceptualisation of health and wellbeing may similarly misappropriate this conceptualisation in broader health promotion discourse. When advertisements for unhealthy food and beverages appropriate the concepts and language of health promotion, this weakens health promotion messages.

The increasing popularity of a holistic conceptualisation of health and wellbeing has also created increased marketing opportunities for food and beverage manufacturers.[289, 291] We found that associating beverages within a wider conceptualisation of health and wellness expands the opportunities for consumers to use these beverages. For example, the advertisements included occasions when a consumer needs to be mentally alert, relaxed, and to achieve the most out of exercise and social situations. Simultaneously, the advertisements suggested that if consumers do these things they will be happy, feel accomplished and abide by current scientific knowledge. When the set of advertisements are taken as a whole, several consumption occasions throughout the day are promoted. The focus on consumption occasions that address broad health and wellbeing needs have

similarly been reported in market research by Euromonitor as contributing to increasing every day and throughout the day beverage consumption.[292] Advertising beverages in this way reframes frequent consumption of sugar-containing beverages as contributing to health and wellbeing and diverts attention from the negative health implications of frequent consumption of these beverages.

Regulation of marketing claims relating to nutrient content and nutrient-health relationships is limited in its capacity to address much of the health-related marketing messaging we observed in sugar-containing beverage television advertisements; that is, implicit messaging and that pertaining to an indirect effect of consumption on health and wellbeing. Given implicit health-related marketing can have a health halo effect,[145, 146] more stringent regulation of the marketing practices of sugar-containing beverage manufacturers is needed. One approach is to expand existing regulation, for example the Australian New Zealand Food Standards Code on Nutrition, Health and Related Claims in Australia,[140] to restrict a wider array of health-related content in marketing. However, creating and enforcing content restrictions that address the use of a broad conceptualisation of health and wellbeing in marketing will likely prove difficult, particularly when the benefits to health and wellbeing are implied through an indirect association, and if implemented as a sole regulatory measure. Another approach is to implement a ban on the marketing of sugar-containing beverages, as is now identified as an effective measure in reducing sugar-containing beverage consumption.[293] The Chilean Food Labelling and Advertising law, introduced in 2016, currently provides one of the most comprehensive examples of food and beverage marketing regulation globally.[293-295] The Chilean law prohibits the advertising of food and beverages high in energy, sugars, saturated fats and/or sodium on television during the hours of 6am-10pm and further imposes child-specific content restrictions on the advertising of these products outside of these hours.[295] The Chilean law does not specifically regulate health-related marketing, with the exception of claims directly related to nutrients of concern (i.e. sugar, saturated fat and sodium), which has previously been raised as a limitation of the regulation by others.[295, 296] To help address the misleading marketing of sugar-containing beverages as healthy, or better for consumers than in actuality, other countries such as Australia could look to implement regulation similar to the Chilean Food

Labelling and Advertising law, which could be further enhanced by the inclusion of health-related content restrictions.

5.2.6 Limitations and future research

In the current analysis, there are aspects that might be further elaborated, such as the active role advertisements play in both reflecting and constructing public values and ideologies. For example, we have touched upon elements in the advertisements that allude to a personal responsibility for health and how the beverage is presented to encourage consumers to assume this responsibility. A wider discussion could be had about how such advertising may undermine public health efforts at an ideological level. Additional messaging and persuasive devices also exist within the wider sample of beverage advertisements that were not directly related to the discussion of health and wellness. It is also important to examine how else beverages are being advertised and additional messaging that is currently used to sell these products as they can also influence consumer perceptions and consumption of sugar-containing beverages.

The limitations of the initial collection of the advertisement dataset have been noted elsewhere.[282] The sample of beverage advertisements used in this study is limited to the brands and beverage types advertised on the network as captured by the data collection tool and the results cannot be generalised to all sugar-containing beverages, as is the case with most qualitative research. While the sample reflects some well-known brands amongst beverage categories, other popular brands are absent. In addition, beverage categories such as juice and coconut water which are promoted as healthy or better-for-you were also not present in this data set.[219] The reason for this absence is unclear. Analysing multimedia advertisements for such beverages may provide more in-depth insight into how these beverages are associated with health and wellness in advertising.

Advertising is dynamic: it changes to reflect and address changing consumer values and demands while also generating consumer demand. Our data are therefore reflective of the advertising of sugar-containing beverages at the point in time it was aired. However, healthy living remains an influential driver of global consumption.[292] It is therefore likely that the messages identified in this research will continue and potentially increase in predominance.

5.2.7 Conclusion

Sugar-containing beverages are positioned as contributing a functional role within a broad conceptualisation of health and wellness that aligns with how consumers are increasingly understanding health and nutrition. Positioning beverages in this way promotes a range of consumption occasions and deflects attention from the negative health consequences associated with frequent consumption of sugar-containing beverages. Situating beverages within this wider conceptualisation also aligns with a wider health discourse; those working in health promotion should be cognizant that the language used to promote health and to advertise sugar-containing beverages can overlap.

Chapter 6: Focus groups with young adults

6.1 Chapter outline

This chapter presents Study 3. Study 1 and Study 2 addressed the thesis aim of investigating how sugar-containing beverages are marketed as healthy. This study addresses the thesis aim regarding how health-related marketing of sugar-containing beverages may influence consumers' perceptions of these beverages. Study 3 specifically aims to answer the research question: *how do Australian young adults aged between 18 and 25 years conceptualise what makes a beverage healthy, or healthier?* To address this research question, I conducted focus groups and thematically analysed the data to allow for a rich analysis of perceptions of beverage healthfulness.

Much of the existing literature has focused on assessing perceptions and knowledge of sugar content and health-related consequences of frequent consumption of sugar-containing beverages. This study addresses the gap in the literature regarding consumer perceptions of beverage healthfulness that extend beyond sugar content and adverse health consequences.

The research is presented in the form of a peer-reviewed publication.[277] The ethics application and recruitment and participant information material used in this study are provided in Appendix H-J. An additional supplementary data table which was not published, presenting focus group participant information and individual beverage healthfulness ranking scores, has been included in Appendix K.

Statement of Authorship

Title of Paper	What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness.
Publication Status	☑ Published ☐ Accepted for Publication ☐ Submitted for Publication ☐ Unpublished and Unsubmitted work written in manuscript style
Publication Details	Brownbill AL, Braunack-Mayer A, Miller C. What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness. Appetite. 2020;150:104675.

Principal Author

Name of Principal Author (Candidate)	Aimee Lee Brownbill		
Contribution to the Paper	Conceptualised and designed study; ethics application; conducted recruitment, facilitation and transcription of focus groups; coded transcripts and analysed data; drafted manuscript, reviewed and revised final manuscript, acted as corresponding author.		
Overall percentage (%)	85%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	14.04.2020

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);

ii. permission is granted for the candidate to include the publication in the thesis; and

iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Professor Annette Braunack-Mayer		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study and data analysis. Reviewed manuscript.		
Signature		Date	20/04/2020

Name of Co-Author	Professor Caroline Miller		
Contribution to the Paper	Provided scientific input regarding conceptualisation and design of study and data analysis. Reviewed manuscript.		
Signature		Date	20/04/2020

6.2 What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness.

6.2.1 Abstract

Background: Sugar-containing beverages are the leading source of added sugar consumption among young adults. The aim of this study was to explore how young adults conceptualise what influences the healthfulness of sugar-containing beverages.

Methods: Seven focus groups stratified by gender and educational institute were conducted with South Australians aged 18 to 25 years (n=32). Focus groups were semi-structured and included a ranking activity where participants individually ranked eight beverages from least to most healthy. Focus groups were recorded, transcribed verbatim and thematically analysed.

Results: Participants commonly selected soda (soft drink) and energy drink as the least healthy beverage and water as the healthiest, but those between varied in rankings. Four themes were identified relating to how participants conceptualise beverage healthfulness in the thematic analysis: ingredients harmful to health, properties beneficial to health, functionality, and packaging. While participants were aware that beverages can contain high amounts of sugar, and that this can be harmful to health, many other factors influence the perceptions of beverage healthfulness and these can outweigh the perceived harms of consumption.

Conclusion: Public health interventions and policies are needed to address misperceptions about the healthfulness of sugar-containing beverages to better put the harms of high sugar consumption in perspective for consumers.

6.2.2 Introduction

Over half of young Australian adults exceed the World Health Organization (WHO) recommendations to limit free sugar consumption.[16] Free sugar is defined by the WHO as "monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates".[14] Sugar-containing beverages are the leading source of free sugar consumption among young adults.[16] Regular consumption of sugar-containing beverages is associated with increased weight gain and obesity,[42] metabolic syndrome and type II diabetes,[47, 48] development of dental caries,[50] and risk of cardiovascular disease.[45] Reducing population consumption of sugar-containing beverages has been identified as one way to help address the impact of overweight and related non-communicable disease on populations.[213]

Sugar-containing beverages are marketed ubiquitously through both traditional and new media platforms, in overt and subtle ways, and in environments popular with young people.[63, 297-299] Previous research has found frequent exposure to sugar-containing beverage marketing enhances attitudes towards marketed sugar-containing beverages[90] and increases beverage selection[84] and consumption.[74, 92] A recent trend in the marketing of sugar-containing beverages is the positioning of beverages as healthy or better-for-you. For example, we previously found better-for-you claims were present on 96.8% of sugar-containing beverage labels in Australia, with these claims commonly positioning the product as natural, emphasising fruit and nutrient content, associating consumption with general wellbeing, and suggesting the beverage has functional properties for maximising sporting performance.[219] Other research has found similar marketing trends are also common on sugar-containing beverage labels in other countries.[158-160] In an online study with US parents, Munsell et al.[154] found that at least a third of participants indicated that health-related claims (low-calorie, real/natural, vitamin C, antioxidants, low-sodium) were important to their decision to purchase sugar-containing beverages for their children. While little research has specifically explored the influence of health-related marketing on consumption of sugar-containing beverages, there is strong evidence showing health-related marketing practices, such as the use of health and nutrition claims, influence the purchasing and consumption of food more generally.[135, 137] Therefore, exploring consumer perceptions of the healthfulness

of beverages is one way to provide insight into the likely effect of health-related marketing of sugar-containing beverages on consumer purchasing and consumption.

Existing research indicates that consumers hold erroneous views about the healthfulness of certain sugar-containing beverages. For example, previous research has indicated that beverages such as juice, flavoured waters, sports drinks (e.g. Gatorade) and iced teas, are perceived to be healthy, or healthier, and as less likely to lead to disease development, compared to soda (or 'soft drink' e.g. Coca-Cola; Sprite) or energy drinks (e.g. Red Bull).[154, 172, 182, 184] While some research has shown that consumers' perceived healthfulness of sugar-containing beverages influences consumption of these beverages,[74, 162] much research to date has focused on sugar content and health-related consequences, indicating that there is general awareness among consumers that sugar-containing beverages can be high in sugar and frequent consumption can lead to weight gain and long-term health consequences.[88, 184, 185] Little research exists exploring what factors beyond sugar content and adverse health consequences contribute to consumers' overall conceptualisation of beverage healthfulness. An experimental sorting study among Swiss parents and their children by Bucher and Siegrist[167] provides some insight into the topic. The authors found that parent and child participants commonly used sugar content and presence of additives, caffeine and fruit when sorting beverages by healthfulness and these factors predicted perceptions of beverage healthfulness.[167] Although the study noted several other factors mentioned by parents and children as influencing their sorting of beverages by healthfulness (e.g. naturalness and presence of vitamins) it did not provide an analysis of the influence of these factors on the perceptions of beverage healthfulness, or consider how all factors interact in the overall conceptualisation of beverage healthfulness. Given marketing research has suggested that better-for-you marketing is currently used in attempt to address increasing consumer concerns of the sugar content in beverages and has forecasted that this marketing trend is likely to continue and increase,[221] further consideration should be given to how consumers' concerns about the sugar content and adverse health consequences of frequent consumption are more broadly assessed in the overall conceptualisation of beverage healthfulness.

This study builds on previous research to gain a better understanding of how the health-related marketing of sugar-containing beverages may influence consumers' perceptions of

these beverages. To do this, the study aims to develop an understanding of how young adults conceptualise beverage healthfulness through exploring what characteristics and properties of beverages are perceived as healthy or unhealthy and how these perceptions are processed and reasoned to form an assessment of whether a beverage is healthy, healthier, or not healthy. We focused on young adults as they are among the highest consumers of sugar-containing beverages[16, 32] and are a prime target for food and beverage marketing.[300] Further, to our knowledge, no research has specifically explored the perceptions of beverage healthfulness among young adults and how health-related marketing may influence their perceptions. Our specific research question for the present study was "How do Australian young adults conceptualise what makes a beverage healthy, or healthier?"

6.2.3 Materials and methods

We used a critical realist theoretical approach to examine how young adults conceptualise what makes a beverage healthy, or healthier. Through this approach, we focus on both individuals' views of what influences beverage healthfulness and the ways that the broader social (i.e. through group discussion) and environmental (i.e. through marketing) context might influence those views.[201, 214] We chose semi-structured focus groups for data collection and incorporated an individual exercise to assess individual participant views of beverage healthfulness prior to group discussion on the topic. This allowed us to explore both individual views on the topic and to also encourage complementary interaction and debate between participants, prompting participants to explore and clarify their views on what makes a beverage healthy or healthier with each other. The interactive nature of focus groups was therefore particularly useful for obtaining a deeper understanding of how participants collectively conceptualised beverage healthfulness, and how this may be shaped by health-related marketing.

Participants

As our research question was concerned with young adults, we employed purposive sampling[301] and recruited via educational institutions. We selected one university and one technical and further education (TAFE; i.e. vocational education and training) institute in South Australia to assist in recruiting from different educational backgrounds. We recruited

participants via flyers displayed around campus and in student directed emails which advertised participants were needed for group discussions regarding what young adults think about different non-alcoholic drinks and why they drink them. A participant information sheet was sent to interested individuals who were then screened for eligibility to participate. The inclusion criteria required participants to be aged between 18 and 25 years (inclusive), currently studying at the selected institution and fluent in English for the purpose of participating in the group discussion. We provided participants with an AUD $20 gift card to compensate and thank them for their time and contribution.

Focus groups

We stratified focus groups by gender (male or female) and current educational institution (university or TAFE). The groups were constructed this way to obtain diversity of views, to reduce social bias and to help participants feel comfortable in sharing their views. In total, we facilitated seven focus groups (n=32 participants; 17 female and 15 male) with two groups planned per stratified gender/educational institution (i.e. male university students, male TAFE students, female university students and female TAFE students). Due to participant cancellations the planned eighth group (male TAFE students) did not proceed. The age of participants ranged from 18 to 25 years (with each age represented) with a mean age of 20.3 years. The number of participants in the focus groups ranged between two and seven with a mean of 4.6 participants per focus group. Focus groups were held in October 2018 and March 2019 and were facilitated by AB. Each group was scheduled for a duration of 60 minutes and ran for an average of 51.1 minutes (ranging from 39-65 minutes).

The focus groups were semi-structured and a hierarchical sequence of questions was used to ease participants into discussion and to capture any unprompted discussion related to how participants conceptualised beverage healthfulness.[302] Each group discussion began with a general question about what participants normally drink and why, to introduce participants to the discussion topic and to collect information about consumption behaviours. Eight packaged beverages were then placed in the centre of the table as prompts and participants were asked to discuss whether they were familiar with the beverages and whether the beverages presented were indicative of what they would usually drink. The beverages comprised one beverage from each of the following categories: soda (soft drink), energy

drink, 100% juice, sports drink, iced tea, coconut water, kombucha and water (shown in Appendix L as beverage set one). The beverages were purposively selected to represent different types of ready-to-drink (i.e. ≤600ml) sugar-containing beverages (and one water for comparative purposes) commonly sold in Australian supermarkets.[219] The selected beverages comprised what may be classified as more traditional sugar-containing beverages, such as soda (e.g. Coca-Cola), as well as more contemporary beverages, such as coconut water, iced tea and kombucha which are heavily marketed as healthy or better-for-you via their labels.[219] The same eight beverages were used for each focus group. The participants were then asked to individually rank the eight beverages on a piece of paper from the least healthy (1) to the most healthy (8). After doing so, they were asked to discuss collectively how they went about ranking the beverages. The purpose of this ranking activity was to help facilitate discussion regarding participant views of beverage healthfulness and participants were asked to individually rank the beverages on their own before discussion was opened up to the group in order to reduce consensus by social desirability and prompt discussion of dissimilar views where they arose. The facilitator then handed around additional examples of ready-to-drink sugar-containing beverages that were new to the market and participants were asked to discuss their initial thoughts on these products and then how they would rank these beverages amongst those previously discussed and why. The novel beverages comprised the following: V Pure (energy drink), Red Bull Organics Lemonade (soda), Red Bull Organics Cola (soda), Emma & Tom's Iced Green Tea (iced tea), Pump+ (flavoured water; shown in Appendix L as beverage set two). The beverages were selected as examples that participants were likely to be less familiar or unfamiliar with and that also displayed commonly used health-related marketing on their labels, for example claims such as 'natural', 'certified organic', 'no added sugar', 'antioxidants', and 'a natural source of electrolytes'.[219] This aimed to explore how participants assessed beverage healthfulness when presented with an unfamiliar beverage (and therefore less likely to be influenced by pre-existing views) that is marketed as healthy via their labels and how this assessment is made relative to similar beverages containing less healthy marketing on their labels. Although five beverages were selected, the beverages were randomly rotated between focus groups, with groups being shown two or three of the novel beverages depending on the remaining time allocated for group discussion.

Data analysis

Focus groups were audio and video recorded, transcribed verbatim (pseudonyms were provided to anonymise participant responses) and input into NVivo 11 for analysis.[283] AB familiarised themselves with the data by reading and re-reading transcripts, developing a sense of each focus group transcript alone and in relation to each other. AB then coded transcripts and thematically analysed the data at the sematic level.[214, 217] Although the study was exploratory and coding was mostly inductive, deductive coding based on a simple framework derived from the topic guide was used during the initial round of coding to allow for the comparison of prompted vs unprompted views of what influences beverage healthfulness. To ensure systematic and comprehensive coding, a line-by-line approach was used with all aspects of the data initially coded as important. Codes were analysed for common representations, meanings and values represented within or across focus groups, with the aim to provide a coherent and compelling interpretation of shared patterns of meaning across the dataset, grounded in the data.[214, 217] Given no substantial differences were observed between stratified focus groups, later stages of the analysis focused across the groups. Codes were grouped into potential themes and during this phase of analysis, attention was particularly paid to how codes and potential themes related to participants' conceptualisation of beverage healthfulness. Similarities, differences and connections between potential themes and sub-themes were considered with the aid of thematic mapping, with the final themes comprising several sub-themes which were constructed at the semantic level.[217] The final themes were developed based on their importance to addressing the research topic rather than their prevalence within the data, as is appropriate for a qualitative approach,[217] and were named to reflect their relevance to the research question. The coding and analysis process was iterative and continued consultation among authors occurred throughout the analysis process.

Ethical standards disclosure

We obtained ethics approval from The University of Adelaide Human Research Ethics Committee (approval number H-2018-057). All participants involved in this research gave written informed consent before participating and consent was confirmed verbally before recording devices were turned on during focus groups.

6.2.4 Results

There was a wide range of beverages reportedly consumed, with participants across all groups reporting that they consumed common beverages including: cordial; coconut waters; energy drinks; iced teas; juices/fruit drinks; sodas (soft drinks); sports drinks; smoothies, milks and waters. In the individual beverage ranking activity, most participants identified the water as the healthiest beverage (ranked '8', n=29), followed by coconut water (ranked '7', n=21) as the second healthiest beverage. The coconut water, kombucha, 100% juice and/or iced tea were ranked as healthier than the plain water by the three participants that did not rank the water as the healthiest beverage. Either the energy drink (n=18) or the soda (n=12) were most consistently ranked as the least healthy (ranked '1').

Four themes and ten sub-themes were identified relating to how participants conceptualise beverage healthfulness in our thematic analysis as illustrated in Figure 6.2.1.

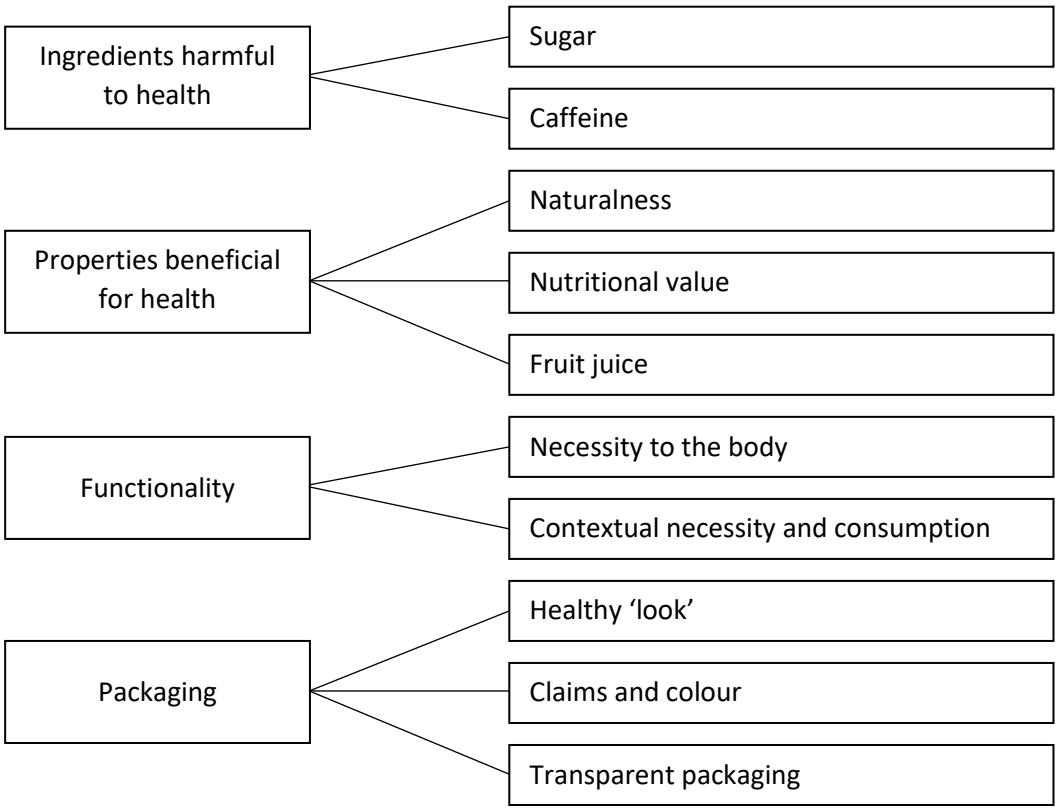


Figure 6.2.1. Thematic map of four themes and 10 sub-themes

While the stratification of focus groups by gender and educational institution allowed for comparison between these groups, no substantial differences of how beverage healthfulness was conceptualised were observed between groups.

Ingredients harmful to health

Sugar

Participants suggested that their primary assessment of healthfulness of a beverage was through considering the sugar content. It was uncommon for participants to look at the nutrition information panel on beverages when making this assessment during focus groups. Rather, participants suggested that they either were aware of the relative sugar content of beverages through previous communications on the topic or they guessed the sugar content based on their perceptions of relative sugar content between beverages.

> "I just thought about sugar mainly, like which had, what had the most sugar in it." Alexis, F, 18, TAFE, FG 7

> "Well I went to the dentist and they had the chart, they like show you which drink has more sugar in it, so I guess I kind of judged it by memory of that." Megan, F, 18, Uni, FG 1

> "I kind of just took a guess, like an estimated guess, based on where everything else fits." Ryan, M, 19, Uni, FG 3

Participants displayed low levels of knowledge of the actual sugar content in beverages, despite suggesting this is how they primarily assessed beverage healthfulness. Additionally, although participants had a general understanding that high consumption of sugar and sugar-containing beverages can be harmful to health, participants lacked specific knowledge regarding the amount of sugar or sugar-containing beverages that would be considered harmful to health. Participants who did refer to an amount of sugar were confused about recommendations. The difference between assessing sugar content per 100ml compared to per serve or package appeared to cause most confusion and led to overestimates of acceptable sugar amount in beverages.

> "I went to a seminar and they sort of showed us a trick that if you just look at the per 100ml and how much sugar it has, it shouldn't have more than 40 grams in the 100ml." Samantha, F, 20, Uni, FG 1

> "I chose that one coz it had like a low sugar content per 100ml but then I looked at per serving and it got higher so now I'm confused." Chris, M, 20, Uni, FG 4

It was common for participants to make general statements that less sugar is better, or to discuss general energy balance than to refer to an amount of sugar in beverages that they considered harmful to health.

> "So, generally less sugar means it's generally better for you" Ryan, M, 19, Uni, FG 3

> "I think as long as you're like using the sugar that you're taking in then it doesn't matter how much you have." Renee, F, 24, Uni, FG 2

Caffeine

High caffeine content was also commonly discussed by participants as contributing to making a beverage unhealthy. Energy drinks, in particular, were viewed as unhealthy for their high caffeine content and this was seen by several participants as an added negative that made energy drinks unhealthier than sodas.

> "I suppose with V [energy drink] you've got a slight addiction liability, with caffeine." Brandon, M, 21, Uni, FG 3

> "I just ranked V as worse [than Coca-Cola], yeah it's mainly stimulants or whatever, I don't know, whatever makes it an energy drink" Chris, M, 20, Uni, FG 4

While caffeine was of concern to participants, like sugar, participants did not know what quantity of caffeine in beverages should be considered harmful to health. However, unlike sugar, several participants spoke about the physiological effect of caffeine on their body.

> "I saw the caffeine content [in the energy drink] is still 13, actually, it's actually pretty like, in milligrams, is that high or is that low?" Andrew, M, 20, Uni, FG 3.
> "I'm not 100% sure to be honest." Ryan, M, 19, Uni, FG 3

"I put V on top [least healthy] because the first time I had V, I think it's the only drink I've noticed the effect, like almost instantly on my body and I was like wow. I was scared the first time." Hunter, M, 19, Uni, FG 3. "You're feeling the fourth dimension." Isaac, M, 19, Uni, FG 3

Properties beneficial for health

Naturalness

Participants' perceptions of the naturalness of the beverage played an important role in the conceptualisation of beverage healthfulness. Naturalness as an indicator of beverage healthfulness was explicitly referred to by participants. Participants also discussed properties of beverages that indicated a low level of naturalness, for example the level of processing, additives and colours.

"I went by what looked the most natural" Kayla, F, 19, Uni, FG 1

"You can't see any natural thing except the water and the sugar in the Coke." Kelsey, F, 19, Uni, FG 2

"It [coconut water] just means nothing else has been added to it. So, I feel like that should make it better for you." Jacob, M, 18, TAFE, FG 6

"I think [Pump+] better than Powerade just coz it's clear" Chris, M, 20, Uni, FG 4

Water was viewed by participants across groups as the most natural beverage, commonly communicated by participants through reference to water having nothing else in it. Participants used how closely a beverage resembled water as an indication of how natural and healthy a beverage was.

"It's [water] just natural. It doesn't have all the extra stuff in it." Melissa, F, 22, TAFE, FG 7

"Straight coconut water is just as healthy as water because that's essentially what it is. Essentially it's just…plant drinks the water, the water seeps in, gets a bit flavoured by the coconut and everything else the plant has and stays there until somebody opens it. It's essentially water, but just a natural flavouring of coconut." Amanda, F, 20, TAFE, FG 5

> "Sometimes when it tastes like water you can already tell. Like, if you compare Coke and water, there's a big difference in taste but if you compare like iced tea and water that one's just a bit more flavoured and sugar so you think oh I'm really not being that unhealthy." Hannah, F, 19, Uni, FG 1

> "It just doesn't seem natural at all, so, it's like, very far removed from something like water." Chris, M, 20, Uni, FG 4

Participants also discussed naturalness in relation to sugar and did not consider 'natural' sugar bad for health when compared to 'added' sugar. Participants were also concerned about artificial sweeteners and saw these are more harmful to health than sugar.

> "I think it's [coconut water] more healthy because it's natural sugar..." Rachel, F, 19, Uni, FG 2

> "I've heard a lot of juices have like added sugar in it, that one didn't have added sugar apparently, so I was confused." Chris, M, 20, Uni, FG 4

> "If they're natural sugar then it's, uh, I don't have any problem. But if it is too much artificial sugar then it's maybe problematic." Aaron, M, 24, Uni, FG 4

While naturalness of beverages was important in participants' conceptualisation of beverage healthfulness, participants commonly showed scepticism towards 'natural' and 'organic' claims made on the label of the novel Red Bull Organics Cola beverage as it did not align with how they overall would assess the beverage in terms of naturalness and healthfulness.

> "It just looks fake. Like it says natural but it feels like they're lying to you." Courtney, F, 19, Uni, FG 1

> "It sounds like it should be healthy but I don't know if there's too many health benefits to just cola, coz I've, I wouldn't think of it necessarily being natural, so the organic claim is a bit, I guess, unjustified." Michael, M, 19, Uni, FG 3

Nutritional Value

Nutritional value was also a common theme in discussions across groups. Beverages that were perceived as having added nutrients were seen as healthier. Nutritional value

appeared to be particularly relevant to participants' ranking of the relative healthfulness of beverages.

> "So that [kombucha] seems like it's supposed to be like water, but all these added vitamins and stuff." Madison, F, 21, Uni, FG 2

> "Kombucha, I know is like kind of fermented tea, black tea, so it's good for like digestion kind of things so I drink it." Rachel, F, 19, Uni, FG 2

> "Well I know that coconut water has electrolytes in it. I don't know what they are but I know that they're good for you." Alexis, F, 18, TAFE, FG 7

> "Then I put water [less healthy], coz water is just, hydration wise it is best, but nutrient wise it doesn't provide as much as the others." Isaac, M, 19, Uni, FG 3

Fruit Juice

Many participants perceived juice to be a healthier option. Juices were viewed by some participants as equating to fruit consumption or as providing important nutrients to the consumer. While it was common for participants to identify that juice contained sugar, the perceived nutritional benefits appeared to offset concerns about sugar content for some participants.

> "Well I like fresh fruit in the juice, so kind of mixed with um watermelon or, kinda the fruit it's just like, kinda the vitamin C, because it's hard to like grab an apple or grab multiple fruit at one day so I think one cup of the juice is yep" Rachel, F, 19, Uni, FG 2

> "I mean the purpose of the juice is to give you vitamins so it's probably actually healthy but it's just got sugar." Hannah, F, 19, Uni, FG 1

> "I think the orange juice is difficult because it's a lot of sugar intake, you shouldn't be drinking that much orange juice, but technically it's also healthy because it's fruit, so it's healthy if you don't have the whole thing I guess." Madison, F, 21, Uni, FG 2

Functionality

Necessity to the body

The functionality of a beverage also influenced how participants conceptualised beverage healthfulness. When a beverage was seen as a necessity, it was viewed as healthier, with necessity commonly constructed by participants as fulfilling what the body needs. This was often explicit in participants' discussion of beverages perceived as the healthiest and most unhealthy. For example, water was often described as a given necessity to the body while energy drinks and sodas were seen as unnecessary.

> "I was kinda looking at like vitamins and minerals and what your body needs." Sam, M, 23, TAFE, FG 6

> "Our body needs water whereas it doesn't really like need any of the others." Shelby, F, 20, TAFE, FG 5

> "It [energy drink] seems like it's unnecessary and probably bad for you, if your body has all this crap that it has to deal with is." Renee, F, 24, Uni, FG 2

Participants also justified the consumption of beverages they otherwise viewed as the most unhealthy as addressing their immediate needs. For example, energy drinks and, for some participants, sodas were discussed as being consumed to combat fatigue and stress.

> "If I feel like I need an energy drink to kick start me I'll just drink one" Jacob, M, 18, TAFE, FG 6

> "I have like sugary drinks as a pick-me-up. Like, just as, if you're running low during the day." Kayla, F, 19, Uni, FG 1

> "I guess they [energy drinks] provide a temporary benefit for students going through stressful times" Ryan, M, 19, Uni, FG 3

Contextual necessity and consumption

Participants also discussed the body's needs as being contextual. When a context was seen to create a necessity for beverages, participants conceptualised beverages as being healthy, or healthier, than if the beverage was to be considered or consumed outside of the context.

In this regard, beverage consumption was constructed as addressing a specific purpose for participants.

> "I put down Powerade as number 5 as being like reasonably healthy but only in certain circumstances. So, if you're extremely hungover and need the electrolytes or if you've been sweating loads and again need the electrolytes to balance it out." Stephanie, F, 18, Uni, FG 2

> "If the drink doesn't have, doesn't serve its purpose then what's the point of drinking it?" Hannah, F, 19, Uni, FG 1

The context most discussed was exercise, with participants suggesting that sports drinks can be needed to replace a perceived loss during exercise. In these discussions, the perceived need for consuming these beverages were seen by participants as more important than concern for sugar content.

> "I think it just depends on which way you view it. So if for example, you were stuck in a very isolated place with only a limited amount of liquid you would take, water would probably be your best choice, but if you were for example, going for a run and then you came back home tired, water might be a really good choice but you might want something that can help provide additional nutrients to help build up your body. So it just depends on what the objective you're looking for." Isaac, M, 19, Uni, FG 3

> "Powerade [sports drink] has a great amount of sugar. It also has everything that the body loses because it is designed for exercise, and it pretty much puts back everything you lose when you sweat. Which you lose sugar, you lose salt and you lose water and that's pretty much what they've done, they've just put all that in here." Amanda, F, 20, TAFE, FG 5

Packaging

Healthy 'look'

Participants focused on the packaging of beverages in their discussions about novel beverages they were unfamiliar with. Many participants saw the novel beverages as being

healthier than comparable, more familiar beverages. However, participants were often unable to articulate why they thought this. Most participants made general comments about the product looking healthy, or healthier, than alternatives.

> "I mean from the label it [V Pure] seems healthier than the Coke and the V drink" Hannah, F, 19, Uni, FG 1

> "It's like they're trying to be healthier [Red Bull Organics Lemonade] so it's probably not as bad as like the V and Coke and stuff, but I also don't think it would be healthy, but it's probably better for you than the badder things" Melissa, F, 22, TAFE, FG 7 "Yeah it's like, it's packaged to look healthier than normal so it must be, because otherwise they wouldn't, you know, package it like that." Alexis, F, 18, TAFE, FG 7

> "If I were buying something I would probably go for something like that [Emma & Tom's Iced Green Tea] or the coconut water or the kombucha because they look healthy" Madison, F, 21, Uni, FG 2

Claims and colour

Some participants also referred to specific claims, images and colours used on the beverage labels. These addressed wider participant discussions of ingredients seen as harmful to health or beverage properties seen as beneficial to health, as presented above.

> "For me like, there's the antioxidants and no added sugar [points to claim on label], it's mainly people are buying it and trying it because it should be really healthy, so it's this kind of marketing that makes me want to buy this [Emma & Tom's Iced Green Tea]." Sam, M, 23, TAFE, FG 6

> "It might feel stupid but those don't look like 'healthy' [air quotes] colours [Red Bull Organics Cola]." Kayla, F, 19, Uni, FG 1

Transparent packaging

Participants thought that a transparent package indicated a healthier beverage. Some participants suggested that transparent packaging was linked to transparency about the beverage, i.e. what you see is what you get.

"A lot of energy drinks are in cans like [points to energy drink] and so like when you see that it just, like you just think ehk, but in the bottle [V Pure] that's like what healthier drinks are in, like Kombucha and stuff." Alexis, F, 18, TAFE, FG 7

"In comparing the two V products, that one [V Pure] looks healthier because you can see inside of it." Madison, F, 21, Uni, FG 2

"The packaging is kinda friendly just coz it's see through [Emma & Tom's Iced Green Tea]" Kayla, F, 19, Uni, FG 1. "Yeah it feels less like you don't know what you're gonna get" Ashley, F, 19, Uni, FG 1

6.2.5 Discussion

This study has explored how young adults conceptualise the healthfulness of sugar-containing beverages. Much of the existing literature on consumer perceptions of sugar-containing beverages have focused on energy drinks[58, 66, 89, 165, 176, 178, 183] and sodas[88, 303] and in the current study these beverages were easily identified as unhealthy. Our study offers further insight into how sugar-containing beverages other than sodas and energy drinks are perceived in relation to health. Overall, we found that participants conceptualise beverage healthfulness through weighing beverage ingredients and properties they viewed as harmful to health against those viewed as beneficial to health, while also considering the context for consumption.

What information is used to conceptualise beverage healthfulness?

Sugar content, nutritional value, naturalness and functionality were important factors participants considered in their conceptualisation of beverage healthfulness. Participants suggested that sugar content was a primary indicator of how healthy a beverage was but lacked knowledge about the amount of sugar in beverages, and how much should be considered harmful for health. This finding is consistent with previous research.[88, 171, 184, 185, 189] We found that without an understanding of how much sugar consumption is harmful to health, participants used a less is better-for-you approach. In practice, without a clear reference point to healthy sugar consumption limits, the average sugar content of sugar-containing beverages may set a point of reference so that beverages with relatively less, but nevertheless high, sugar content are more readily accepted and selected by consumers.[304]

When participants viewed beverages as more natural and/or offering nutritional value they also conceptualised them as healthier. Research has consistently shown that foods viewed to be natural are perceived as healthy by consumers.[305] Research has also shown that consumers perceive the relationship between nutrient intake and biological functioning to be linear rather than curvilinear.[306] Of particular note, some participants conceptualised beverages they viewed as having high nutritional value as superior to water. Conceptualising beverages this way aligns with other research which has found that young adults do not see bottled water as good value for money when compared to sodas.[88] Consumer research has also shown that millennial consumers are increasingly concerned with added nutritional value.[307, 308] Further, we found that, despite identifying ingredients and properties that were seen to increase nutritional value, participants were unable to articulate why they thought this to be the case. Sports drinks were an exception, with participants readily explaining that electrolytes in sports drinks functioned to replace what was depleted from the body during exercise. This aligns very closely with the ways in which sports drinks are marketed[63, 219] and it has previously been found that one in six children identify sports drinks rather than water as the best drink during physical activity.[173] Therefore public health measures should go beyond simply promoting water as the best option to address misconceptions that water is not always the healthiest beverage option.

Beverage packaging acted as a cue to participants in identifying the factors participants considered important in their conceptualisation of beverage healthfulness. The factors identified as influencing the way participants conceptualised beverage healthfulness aligns with how sugar-containing beverages are advertised on labels.[219] This suggests that current labelling regulation in Australia is not sufficiently preventing misleading health and nutrition related advertising on sugar-containing beverages. We further found that transparent packaging was associated with healthier beverages by participants. This may be the effect of 'clean label' marketing techniques through which simple and clear packaging along with simple ingredient listing are used to address perceived naturalness of products.[305] Clean labelling may be more effective at influencing young adults' perceptions as they prefer an 'authentic' feel from a product rather than natural used as a descriptor on package.[309] This was evident in the current study in participants' views of 'natural' and 'certified organic' claims on Red Bull Organics Cola, with participants not finding this to be a credible claim.

This is likely the result of participants viewing energy drinks as unhealthy, with previous research suggesting that the effect of health and nutrition claims can be reduced when they do not match consumers' perceived healthfulness of the product.[137]

How is sugar weighed up against other beverage attributes?

Participants easily identified the beverages they perceived to be the healthiest and least healthy. For beverages that fell between the extremities of the healthiest and least healthy, more emphasis was placed on beverage naturalness and nutritional value than on sugar content. Previous research has similarly shown that consumers often focus more on added nutrients than unhealthy ingredients and that added nutrients can be seen to counteract the effect of unhealthy ingredients.[137, 138] A study exploring young adults' evaluation of the nutritiousness of snack foods also found that young adults focus more on positive aspects of snack foods while disregarding less healthy aspects.[310] The study similarly found that while young adults commonly cited sugar content when defining a nutritious food, naturalness was cited almost twice as often than sugar content when ranking snack food nutritiousness.[310] We found that naturalness was also important when assessing the sugar content of beverages, with natural sugar viewed as healthier than added sugar or artificial sweeteners. Similar findings have been reported in previous research.[170, 171, 311] Therefore the type of sugar or sweetener may also mediate consumers concern about the amount of sugar.

We further found that functionality of beverages may negate concern about sugar content. Participants suggested that different beverages serve different purposes and are needed in certain contexts with sugar consumption seen as justified in these contexts. This may be because consumption can address the immediate needs of the consumer, while the health consequences of sugar-containing beverage consumption are considered long term and therefore of low personal relevance to young adults.[88, 185] Future research could explore whether presenting health-related information within a shorter term context resonates with young adults.

Implications

Our findings suggest that young adults' conceptualisation of what makes a beverage healthy align with the health-related commercial marketing of sugar-containing beverages. This includes marketing that overtly position sugar-containing beverages as healthy, such as the use of nutrition content claims,[155, 157, 158, 160, 219] and marketing that does this subtly, such as through the use of sport.[59, 63, 158, 159, 219, 312] While labelling is one route of health-related marketing for sugar-containing beverages,[115, 155, 157-160, 219] and is the example we have used in this study, it is important to recognise that young people are exposed to health-related marketing messages for sugar-containing beverages in many ways. For example, previous research has observed health-related messaging in television advertisements for sugar-containing beverages[59, 125, 129] and in content shared by sugar-containing beverage brands on social media platforms.[60, 61, 63, 313] Young people may be particularly receptive to the marketing delivered via social media platforms due to the brand-consumer engagement opportunities afforded and encouraged by sugar-containing beverage brands on these platforms.[63, 298, 314-316] Young people are therefore not only receiving commercial marketing messages about health and nutrition, but also amplifying and reinforcing them through their peer networks on social media platforms by engaging with this content.[298, 299] More stringent regulation is required across all forms of health-related marketing by sugar-containing beverage manufacturers given these marketing practices may mislead consumers to more positively assess the healthfulness of sugar-containing beverages and undermine public health efforts.

6.2.6 Limitations

Our sample is limited to young English-speaking adults who have engaged in vocational or university level education. Therefore, findings cannot be generalised to all young adults as conceptualisations of beverage healthfulness may differ among those with lower educational attainment, of different ages and who come from certain migrant groups who may have been excluded by language criteria. While we were primarily interested in young adults as a population group with high consumption of sugar-containing beverages, and participants indicated they consume a range of beverages, we did not measure participant's consumption of sugar-containing beverages. A previous population study in South Australia, where this study was conducted, found that frequent consumption of sugar-containing

beverages is higher among those aged 15-24 years, those with lower education and those living in areas of the highest disadvantage.[189] Therefore, the inclusion criteria for this study which captured participants with vocational or university education may have resulted in a sample with lower consumption. Future research could explore how conceptualisation of sugar-containing beverage healthfulness differs by level of consumption. Greater insight may be particularly gained through conducting research with frequent consumers of beverages that are viewed as better-for-you. Further, while we were particularly interested in exploring health-related views about sugar-containing beverages it was also evident that health may not be the primary reason for selection of beverages among young people. Previous research has indicated that price and taste are important cues for consumption of sugar-containing beverages among young adults.[88, 170]

6.2.7 Conclusions

While young adults are aware that beverages can contain high amounts of sugar, and that this can be harmful to health, many other factors influence young adults' conceptualisation of beverage healthfulness. Public health interventions and policies are needed to address misperceptions about the healthfulness of sugar-containing beverages to better put the harms of high sugar consumption in perspective for consumers. Properties and packaging of beverages also influence how young adults conceptualise beverage healthfulness and public health policies should aim to prevent the misleading advertising of sugar-containing beverages as healthy.

Chapter 7: Thesis discussion and conclusion

7.1 Chapter outline

In this chapter I discuss the overall body of work presented within this thesis. I begin by providing an overview of the main findings from each study, discussing the connections between each and clarifying the contributions made to the wider body of literature. I then address the limitations of the work. I finish with a discussion of my recommendations for policy and practice and directions for future research.

7.2 Key findings and significance

The overarching aims of this thesis were to investigate how sugar-containing beverages are marketed as healthy, or as having health-related benefits, and how this marketing might influence consumers' perceptions of these beverages. To do this, I conducted a mixed-methods project comprising three studies which build on and address gaps in existing literature (outlined in Chapter 2). I addressed how sugar-containing beverages are currently marketed in Australia as healthy, or as having health-related benefits, via a) product labels and b) television advertising. I then addressed how the health-related marketing of sugar-containing beverages may influence consumers' perceptions of these beverages by exploring how young Australian adults conceptualise beverage healthfulness. Combined, the findings from the three studies within this thesis demonstrate that the health-related messages promoted through sugar-containing beverage marketing corresponds with consumer perceptions of beverage healthfulness. Juxtaposing this with previous research reviewed in Chapter 2, I draw the following three conclusions which I briefly discuss below:

i. Certain beverage categories are strongly positioned as healthy or better-for-you in their marketing and this can have a health halo effect for consumers.
ii. Nutritional value, naturalness and functionality are commonly referenced in the health-related marketing of sugar-containing beverages and this overlaps with how consumers conceptualise beverage healthfulness.
iii. Health-related marketing of sugar-containing beverages distracts consumers from concern about the sugar content of beverages and the adverse health consequences of frequent consumption.

i. Certain beverage categories are strongly positioned as healthy or better-for-you in their marketing and this can have a health halo effect on consumers.

Some existing research has reported that flavoured waters and fruit-flavoured beverages use nutrition-related marketing[157, 158] and are viewed as healthier than several other beverage categories.[154, 162, 167, 182] However, the marketing of newer beverages such as coconut water and kombucha, and consumer perceptions of these beverages have not been previously analysed. I documented the current Australian sugar-containing beverage market and found that coconut waters, juice, iced teas (including kombuchas) and sports drinks were strongly marketed as healthy. In study three, I also found that these beverages were perceived by consumers as healthy or healthier options, particularly newer beverages such as coconut water and kombucha. Therefore, it appears that beverages within these categories may receive a health halo. This is problematic, as I also found the average sugar content of these newer beverage categories to be of concern from a population health perspective as their consumption would largely contribute to the daily recommended limit of free sugar intake. It is likely that as public discussion regarding the adverse health consequences of frequent consumption of free sugar, and sugar-containing beverages, continues and potentially amplifies, novel beverages will continue to be introduced and marketed to appeal to consumers' health-related perceptions. It is therefore important for those interested in reducing consumption of sugar-containing beverages to be cognisant of new beverages entering the market and the marketing strategies used to position beverages as healthy.

ii. Nutritional value, naturalness and functionality are commonly referenced in the health-related marketing of sugar-containing beverages and this overlaps with how consumers conceptualise beverage healthfulness.

Nutritional value

Previous studies have commonly measured the use of nutrition content claims, particularly as defined using country-based regulation,[59, 113, 116, 155-160] and have suggested that beverages containing fruit or vitamins and minerals are perceived by consumers as healthy or healthier options.[154, 161, 167, 170, 172, 178, 185, 188] I similarly found that the presence of 'healthy' nutrients

are frequently advertised, both through the use of regulated nutrition content claims and through unregulated claims, and are conceptualised by consumers as providing added nutritional value to sugar-containing beverages in Australia. Further, the Health Star Rating System, which aims to be an indicator of the nutritiousness and healthfulness of products, is currently used in ways that are likely to reinforce consumer perceptions of juices as healthy options, despite their high free sugar content. Therefore, current public health regulations potentially reinforce commercial marketing practices that are positioning sugar-containing beverages as providing nutritional value.

Naturalness

Consumers perceive product naturalness as an indicator of product healthfulness[305] and this is also the case for sugar-containing beverages.[84, 154, 161, 167, 188] I found that many explicit and implicit marketing techniques are used to position sugar-containing beverages as natural and that these overlap with how consumers assess beverage healthfulness. While popular and expert nutritional advice suggest consumers seek "real", "whole" or "natural" foods, this discourse is also present in the commercial marketing of "real", "whole" or "natural" ingredients in highly-processed food and beverages, suggesting to consumers that these may be appropriate substitutes.[122, 241] Therefore, associating sugar-containing beverages with naturalness may be one way that marketers try to address negative connotations with what are inherently 'unnatural' products.

Functionality

Previous research has observed references to physical activity and sport in sugar-containing beverage advertisements,[59, 158, 159] and many studies have indicated that energy drinks and sports drinks are perceived by consumers as aiding physical activity and sports performance.[66, 77, 88, 89, 166, 173, 176, 179, 181, 185, 186] I also observed this in the three studies in this thesis. However, less research has explored functionality pertaining to a wider conceptualisation of health and wellbeing. I found that beverages are positioned as functional to the consumer in several ways that extend beyond physical activity and sport. Further, while research specifically on the topic of perceptions and consumptions of energy drinks has indicated that energy drink consumers are motivated by functional outcomes,[58,

[66, 77, 87, 89, 165, 175, 176, 178-181] the influence of beverage functionality on perceptions of beverage healthfulness have not been explored. Across the studies in this thesis, I found that functionality is marketed, and considered by consumers as important, across beverage categories. I found that the context and perceived need for consumption can influence consumers' assessment of beverage healthfulness. In this way, beverages that may be seen as unhealthy due to high sugar or caffeine content can also be accepted as healthier if consumed in certain circumstances where they are perceived as meeting a specific function or need. Therefore, consumers can justify their consumption in a range of ways.

iii. Health-related marketing of sugar-containing beverages distracts consumers from concern about the sugar content of beverages and the adverse health consequences of frequent consumption.

Previous research has reported that there is general awareness among consumers that beverages can be high in sugar and that frequent consumption of beverages high in sugar can lead to weight gain and long-term health consequences.[84, 88, 173, 185, 189-192, 317] The research in this thesis has gone beyond assessing perceptions and knowledge of sugar content and health-related consequences to develop an understanding of what is of greatest relevance for consumers regarding health when assessing sugar-containing beverages. I found that, when explicitly assessing beverage healthfulness, consumers may consider the sugar content and health consequences of sugar-containing beverages. However, I also found that there are several other factors that can shape consumers' assessment of beverage healthfulness and that these are emphasised in the ways that sugar-containing beverages are marketed. I found that consumers focus more on 'healthy' than 'unhealthy' beverage properties and that 'unhealthy' properties (such as high sugar content) can be ignored if the beverage is consumed within certain contexts or for certain purposes that are viewed more broadly as health-promoting (e.g. physical activity). This is particularly problematic given my finding in study two that the marketing of sugar-containing beverages targets a broad range of contexts and purposes for consumption, and associates consumption within these contexts with healthy lifestyles. This promotes frequent consumption of sugar-containing beverages by marketing them as addressing a wide range

of lifestyle factors that are viewed by consumers as important and healthy. This inherently undermines public health efforts to reduce consumption of sugar-containing beverages.

7.3 Limitations and recommendations for future research

The limitations for individual studies have been acknowledged within their corresponding manuscript. Here, key limitations of the overall research project are discussed.

In this thesis, I use labelling and television advertisements as examples of marketing that address the marketing principles of product and promotion. However, as indicated in Chapter 1, marketing entails a wide range of commercial activities. Price is commonly used to market sugar-containing beverages and has been shown to influence selection and consumption of sugar-containing beverages.[318, 319] The locations in which sugar-containing beverages are sold also constitute marketing activity, and availability has also been shown to influence consumption of sugar-containing beverages, particularly among young people.[303, 320-324] There are also additional routes of sugar-containing beverage promotion which are not covered in this thesis. For example, sugar-containing beverages are promoted through sponsorship of events[66, 325-327] and through content shared online such as via social media platforms.[60, 61, 63, 313] Further consideration could be dedicated to exploring how these other forms of marketing may be used to position sugar-containing beverages as healthy. By way of example, future research could explore how price may be used to market products as healthier through 'premiumisation' (i.e. higher priced products used to indicate healthier and better-for-you products) which has been flagged as an area of opportunity in a 2019 market research report on the global megatrends driving growth in the beverage industry.[292] Future research could also explore how sponsorship of sporting teams and events by sugar-containing beverage manufacturers' may influence consumer perceptions of the healthfulness (particularly contextual perceptions of healthfulness) of these beverages. Further consideration should also be given to how marketing practices may seek to address consumer needs and socio-cultural values that may not necessarily be considered health-related but may influence health-related perceptions. For example, promoting fun and leisure through sugar-containing beverage marketing may contribute to perceptions regarding mental wellbeing. Additionally, it should be acknowledged that marketing

practices may not necessarily address health-related perceptions, but nevertheless influence general consumer perceptions and consumption of sugar-containing beverages.

Marketing is dynamic and can be context-specific. This thesis is situated within the Australian context. Sugar-containing beverages are likely to be marketed differently in different countries, particularly those with vastly different cultures. This research has also been conducted during a time of increased public concern regarding sugar consumption, particularly within Western cultures, and this concern may not be equally reflected between countries and may also change over time. The conclusions of this thesis are therefore of most relevance to the Australian context and may not be widely generalizable.

I have used triangulation to compare how sugar-containing beverages are marketed as healthy with how consumers assess the healthfulness of sugar-containing beverages. While the conclusions have been drawn with support from the wider literature about contemporary socio-cultural values and consumer perceptions (mostly capturing Western populations), it was outside the scope of this project to explore which particular sub-populations are most likely to be receptive to these marketing practices. Further, this research cannot suggest a causal association between the marketing practices measured and consumer perceptions or consumption behaviours. Future research could involve experimental research assessing the effect of the health-related marketing techniques identified in this research on different sub-population groups to provide more evidence to this extent.

In this thesis, I have predominantly focused on non-alcoholic water-based sugar-containing beverages and juice. This was a deliberate decision to provide scope to the research, but which meant that other beverages high in free sugar content have been excluded, although not completely. Flavoured milk beverages provide one example. A recent study assessing the sugar content of flavoured milk beverages across three countries (including Australia) found an average of 9.1g of sugar per 100ml in flavoured milk beverages; 41% of this sugar content constituted free sugars.[328] Study two captured some dairy-based beverages (i.e. Yakult and Milo) and found that these were advertised as healthy beverage options, indicating that this may be an area of interest for future research. Over the duration of this research project, health-related marketing of alcoholic beverages has also begun to receive attention, with a recent study suggesting that health-related marketing similar to that observed in this thesis

is used for alcoholic beverages.[329] Observed examples of the health-related marketing for alcoholic beverages indicate that sugar-containing beverages that are themselves marketed as healthy (as observed in this thesis) are used in positioning alcoholic beverages as healthy or healthier (i.e. as 'mixers' with alcohol).[330] The health-related marketing of alcoholic beverages are of additional public health concern as they are not only encouraging sugar consumption but alcohol consumption which brings its own adverse health consequences.[331]

7.4 Implications and recommendations for policy and practice

Results from this thesis can help inform public health interventions and policies to reduce the health impact of high population consumption of sugar-containing beverages. It is important to note that marketing of sugar-containing beverages is ubiquitous and complex and no one intervention is likely to comprehensively address its effects on unhealthy consumption. Nonetheless, some recommendations based on the findings from this thesis pertaining to the health-related marketing of sugar-containing beverages are presented below.

Regulation of marketing practices

This research has highlighted that sugar-containing beverages are often associated with health and wellbeing through their marketing. The regulatory environment should prevent marketing practices that misleadingly position unhealthy products as healthy. The FSANZ Code (on nutrition, health and related claims[140]) is an existing regulatory measure that specifically addresses health-related marketing, with the aim to prevent such misleading practices. This research has identified several marketing techniques that associate beverages high in sugar with health and wellbeing and suggests that the FSANZ Code is not broad enough in its current scope to effectively capture the true extent of health-related marketing. Precluding products from needing to meet a nutrient profiling score in order to display a nutrition content claim is a particular limitation of the current system when this is required for health claims. Implementing restrictions for nutrition content claims that are similar to health claims will likely see a large reduction in the amount of nutrition content claims used in sugar-containing beverage marketing.

Beyond the FSANZ Code, there is limited government regulation of food and beverage marketing in Australia.[332, 333] Of most relevance to this research project, Australian fair-trading laws prohibit misinforming consumers through false, misleading or deceptive representations of product.[242, 334] The health-related marketing observed on high-sugar beverages in this research could therefore be assessed against fair-trading laws. While uncommon in Australia, taking legal action against misleading health claims in the marketing of food and beverages is increasing in the US[335] The notion is therefore not unprecedented and previous legal trials have successfully upheld complaints of marketing practices which are similar to those observed in this thesis.

There are a number of examples of legal action focused on misleading advertising in this sphere. In 2018, a complaint was upheld against Australian food company Heinz who were ordered to pay $2.25 million in penalties for making false and misleading representation in their marketing of a food product 'Little Kids Shredz' which was represented as beneficial to the health of children aged 1-3 years.[336, 337] The product used claims in its marketing such as '99% fruit and veg' alongside images of fruit and vegetables when the products were predominantly made from fruit juice, concentrate, paste or puree. In 2014, a class action suit was won against energy drink company Red Bull for use of the tagline 'Red Bull gives you wings' in their marketing which was seen to misleadingly imply that the beverage would increase consumers' performance and concentration.[338] Recently, a class action lawsuit has been proposed against The Coca-Cola Company's Honest Tea beverages for claiming that the beverages are "just a tad sweet" in their marketing, suggesting that the beverages are low in sugar when they contain a considerable sugar content.[339]

Such lawsuits, even when unsuccessful, can yield public health benefits through increased publicity of misleading marketing tactics and through the potential for gaining access to internal company communications which can be used in additional public health advocacy efforts against misleading health-marketing practices.[335, 340] However, while such lawsuits are increasing in occurrence, they are resource intensive[335] and do not prevent the use of similar marketing across products and companies that have not been taken to court. Therefore, this approach cannot be relied on alone. Nevertheless, this research has identified numerous marketing techniques that have similar potential for being assessed against fair-trading laws.

The Children's Television Standards 2009 Act, which regulates advertising directed at children through free-to-air television programming, also states that food advertisements cannot contain misleading information regarding the nutritional value of the advertised product.[341] Some advertisements observed in study two could potentially be viewed as in contradiction to this—for example, the Milo advertisement which heavily featured children and advertised the sugary product as healthy. However, these regulations only apply to television advertising and advertising content deemed to be directed at children, which does not prevent children from exposure to this advertising.[332, 333] There are many examples of food advertisers successfully arguing that advertising was not purposefully or directly targeted at children.[333] In general, regulation of food and beverage marketing practices is left to codes of practice that are designed and self-regulated by the food and beverage industry.[342-344] There is a body of research which has shown that food and beverage industry self-regulation of marketing activities are most often vague, permissive and ineffective at preventing problematic marketing activities.[345] This is evident in Australia and internationally.[333, 346-348]

Overall, current marketing regulations do not prevent health-related marketing of sugar-containing beverages. Comprehensive regulation is required to reduce the potential of sugar-containing beverage marketing to mislead consumers to perceive these products as healthier than they are. An example of the most comprehensive marketing regulations to date, both in terms of the products and media covered, is the Chilean Food Labelling and Advertising law.[293-295] The Chilean law is multi-component, requiring warning labels on foods and beverages high in total energy, saturated fat, sugar and/or sodium and prohibits their marketing to children.[293-295] Regarding the marketing component of law, the Chilean law places child-oriented content restrictions on the marketing of unhealthy food and beverages (determined by nutrient profiling) and bans their marketing in television broadcasts and in cinemas during 6am-10pm and in schools.[295] A recent study found that household purchases of sugar-containing beverages significantly decreased after the introduction of the Chilean law, with the largest decreases found for juice-based beverages.[293] Further, the study authors suggest that the Chilean law has had a larger effect on purchasing behaviour than that observed in countries with stand-alone policies, and credit this to the further inclusion of marketing restrictions which are less common in other countries.[293] However, the Chilean

law does not contain any specific regulation pertaining to health-related marketing outside of nutrient content claims relating to nutrients of concern, and this has been noted as a limitation of the regulation by previous authors.[295, 296] Australia could implement a similar regulation to the Chilean Food Labelling and Advertising law, with the addition of enhanced health-related content restrictions that extend what is addressed in the FSANZ Code to cover the wider array of health-related marketing techniques observed in this research.

Informative public health interventions

Informative public health interventions are suggested as one way to help address sugar-containing beverage consumption, namely through social marketing campaigns and nutrition and warning labels. To date, such interventions have predominantly focused on communicating the amount of sugar in beverages and the adverse health consequences associated with frequent consumption.[105, 106, 349-354] With increasing public concern about the health consequences of frequent sugar consumption, such interventions may inform consumers that beverages can contribute large amounts of sugar to the diet with adverse outcomes for health; they may also act as a prompt at point of purchase and consumption to keep these concerns front-of-mind for consumers.[354-360] However, findings from this thesis raise the following questions that could be further considered to enhance and support informative public health interventions.

First, is stating the amount of sugar in beverages enough to inform consumers about the sugar in beverages? Research within this thesis suggests that consumers do not know how much sugar in beverages should be considered too much. While current and proposed interventions often communicate how much sugar are in beverages, this does not contextualise this information for consumers. Such public health messaging could translate and communicate the WHO recommendations for free sugar consumption[14] into consumer-friendly guidelines that communicate the amount of sugar within beverages and enable consumers to contextualise this within recommended daily limits.

Second, is the communicated information of relevance and importance to consumers? Current messaging in sugar-containing beverage informative interventions focus on health consequences relating to weight and NCD from frequent sugar consumption. This thesis demonstrates that commercial marketing promotes sugar-containing beverages within a

wider conceptualisation of health and wellness, and that several factors other than the contribution of sugar to NCD are considered as important by consumers when assessing beverage healthfulness. Future research could explore whether addressing similar consumer motivations and perceptions in public health messaging can further address consumer misperceptions of beverage healthfulness. For example, could social marketing present sugar-containing beverages as harmful to health through using a narrative that disassociates sugar-containing beverages from natural products, or that presents consumption as counterproductive to physical activity? While such counter marketing activities have been documented in the space of tobacco control, for example through the Truth campaign,[361] further research is needed to explore the effect of this in the space of food and beverages.

Third, how effective are informative public health interventions when health-related marketing is ubiquitously present? Measuring the influence of commercial marketing on the effectiveness of informative public health interventions is inherently methodologically challenging given the ubiquitous nature of commercial marketing. However, some research has more discretely explored the effect of front-of-pack nutrition and labels when presented in conjunction with health-related marketing.[143] An experimental study found that the presence of health and nutrient claims can reduce the effectiveness of front-of-pack nutrition labels in preventing selection of unhealthy food product.[136] As demonstrated through this thesis, health-related marketing of sugar-containing beverages is pervasive and beverages can contain several claims per package that position them as healthy. Such interventions are therefore likely to be most effective when implemented alongside policy interventions that preventing misleading health-related marketing of sugar-containing beverages.

Finally, what consumption behaviours do these informative public health interventions encourage? While it may be argued that consumers know sugary drinks are unhealthy and that water is the healthiest option, research in this thesis suggests that is not necessarily the case. A previous study has suggested that warning labels on sugar-containing beverages have little impact (either positively or negatively) on consumer judgements of non-labelled beverages, such as sugar-containing beverages with a sugar content below a pre-determined threshold, non-calorically sweetened beverages and water.[356] Therefore informative public health interventions must also consider the effect on potential substitution, and what

substitutive behaviours to promote. The Health Star Rating System provides one potential avenue for influencing substitutive behaviours, with a previous study showing that, where other labelling can deter selection of sugar-containing beverages, the Health Star Rating can also help shift consumption toward those explicitly indicated as healthier options by the system.[355] Given the Health Star Rating System may be seen as an indicator of overall healthfulness and nutritiousness, rather than being specific to sugar, it may also help to address misperceptions regarding certain sugar-containing beverages as healthy or healthier options. Recently regulators have agreed to alter the Health Star Rating scoring for beverages, and star ratings are likely to substantially change across beverage categories as an outcome.[271] To provide further evidence in this space, future research should assess the outcome of these changes on the ratings across beverage categories, the impact of these ratings on consumer perceptions and consumption behaviours, and re-assess the use of the updated scoring system by beverage manufacturers for potential marketing biases in the voluntary system.

7.5 Concluding remarks

In this thesis, I have described and analysed the health-related marketing of sugar-containing beverages in Australia. I included a range of traditional and more recent sugar-containing beverages and explored emergent 'better-for-you' and health-related marketing trends. My findings demonstrate that health-related marketing of sugar-containing beverages is likely to resonate with consumers and may affect consumers' perceptions of the healthfulness of these products; ultimately this undermines public health efforts to reduce population consumption. Those working on public health policy, interventions and research who seek to reduce population consumption of sugar-containing beverages must be cognisant of contemporary marketing practices and how these may function to undermine public health efforts.

Appendices

Appendix A – Study 1 published manuscript 1

Public Health Nutrition: 21(18), 3335–3343 doi:10.1017/S1368980018002392

Industry use of 'better-for-you' features on labels of sugar-containing beverages

Aimee L Brownbill[1,2,*], Caroline L Miller[1,2] and Annette J Braunack-Mayer[1,3]
[1]The University of Adelaide, School of Public Health, Adelaide Health and Medical Sciences Building, Adelaide, SA 5005, Australia: [2]South Australian Health and Medical Research Institute, Population Health Research, Adelaide, SA, Australia: [3]University of Wollongong, School of Health and Society, Wollongong, NSW, Australia

Submitted 22 March 2018: Final revision received 27 July 2018: Accepted 14 August 2018: First published online 10 October 2018

Abstract
Objective: To examine the ways in which sugar-containing beverages are being portrayed as 'better-for-you' (BFY) via features on product labels.
Design: Cross-sectional audit of beverage labels.
Setting: Adelaide, Australia. Data on beverage labels were collected from seventeen grocery stores during September to November 2016.
Subjects: The content of 945 sugar-containing beverages labels were analysed for explicit and implicit features positioning them as healthy or BFY.
Results: The mean sugar content of beverages was high at 8·3 g/100 ml and most sugar-containing beverages (87·7 %) displayed features that position them as BFY. This was most commonly achieved by indicating the beverages are natural (76·8 %), or contain reduced or natural energy/sugar content (48·4 %), or through suggesting that they contribute to meeting bodily needs for nutrition (28·9 %) or health (15·1 %). Features positioning beverages as BFY were more common among certain categories of beverages, namely coconut waters, iced teas, sports drinks and juices.
Conclusions: A large proportion of sugar-containing beverages use features on labels that position them as healthy or BFY despite containing high amounts of sugar.

Keywords
Sugar-sweetened beverages
Marketing
Advertising
Food labels
Health halo

The high global consumption of sugar-containing beverages has gained international public health attention due to its contribution to obesity[1] and non-communicable diseases such as type 2 diabetes[2], CVD risk factors[3] and tooth decay[4]. A number of governments have introduced policies to reduce consumption of sugar-containing beverages through taxation, restrictions on marketing and public awareness campaigns[5]. It is therefore unsurprising that consumers are becoming concerned about the adverse health effects of these beverages[6].

Community concern about sugar consumption appears to have led to changes in the marketing of sugar-containing beverages, for example through increased advertising of beverages as 'better-for-you' (BFY)[6]. 'Better-for-you' is a term used increasingly by the food and beverage industry in marketing publications and in market reports[6,7]. It is starting to appear in public-facing websites (e.g. PepsiCo)[8] where 'better-for-you' brands (e.g. Pure Leaf iced teas and Grain Waves) are presented in contrast to 'fun-for-you' brands (e.g. Pepsi and Doritos). The BFY category is broad and ill-defined[6,7], including both health and nutrition claims and products classified as 'good' ('products that generally are considered wholesome')[9].

In Australia, foods and beverages are required to display a Nutrition Information Panel. Nutrition information labels are common in many countries; however, their relative complexity often results in low usage among sub-populations at the highest risk of developing nutrition-related chronic illnesses[10]. Health and nutrition claims are another source of nutritional information provided on food and beverage packages. While it is the manufacturers' decision whether to display health and nutrition claims or not, regulations exist around their use in Australia[11]. The use of health and nutrition claims on food and beverage labels is well documented. A number of studies show that consumers believe a product is healthier if it carries a health- or nutrition-related claim[12–15] and a recent meta-analysis concluded that health and nutrition claims have a substantial effect on dietary choices[16]. However, these studies often do not address broader, unregulated, BFY features on food and beverage labels,

*Corresponding author: Email aimee.brownbill@adelaide.edu.au

which has been identified as a limitation of previous research[17–19].

The present study describes the features on sugar-containing beverage labels that position them as BFY, encompassing features that include, but are not limited to, health and nutrition claims. We defined a BFY feature as 'text or an image on packaging that either claims or implies that a product has health-related benefits or is a healthier option'. This definition includes both claims that directly state a health benefit and broad terms that imply the product may play a role in health or well-being. The display of BFY features on labels may lead consumers to believe these sugar-containing beverages are healthier for them than they would if the labels did not display BFY features; this is known as a 'health halo' effect[20,21]. Understanding the messaging communicated to consumers through the BFY construct has the potential to provide further insight into trends of sugar-containing beverage consumption, including shifts from soda to other beverage types.

Methods

Data collection

During September to November 2016 we conducted an audit of labels on all non-alcoholic/non-dairy packaged beverages in South Australian grocery stores. We selected seventeen stores from leading grocery store chains[22]. Stores were purposively sampled from across areas of differing socio-economic status according to the 2011 Socio-Economic Index for Areas score[23] to ensure that any potential differences in the availability of beverages in differing socio-economic areas were captured. The method of data collection was based on similar studies of packaged food and beverage label audits[24–26]. We photographed the packaging of all non-alcoholic/non-dairy beverages of size 1 litre (34 fl. oz) or less from each store. Multipacks and packages where information was not presented in English were excluded. The study was granted an exemption from Human Research Ethics Committee review.

Study sample

We recorded product descriptions (product name, flavour and package size). Product duplicates were removed from the sample. Multiple package sizes were also excluded after initial analysis of a subset of products found no difference between features on different sizes of products.

We classified products by beverage type (alcohol substitutes, coconut water (flavoured or plain), concentrates, energy drinks, fruit drinks, iced teas, juices (100 % juices separated), soda, sports drinks, flavoured water (still or sparkling) and other (i.e. probiotic drinks); see online supplementary material, Supplemental Table 1 for definitions) and recorded the sugar content. For the purposes of the present study, beverages were categorised as either sugar-free (<1 g/100 ml) or sugar-containing (≥1 g/100 ml). Sugar-containing beverages were further categorised depending on their sugar content as low sugar (≥1 and ≤2·5 g/100 ml), medium sugar (>2·5 and <5 g/100 ml), high sugar (≥5 and <10 g/100 ml) and very high sugar (≥10 g/100 ml). Low sugar was categorised based on requirements for making a low sugar claim on packages[14]. High and very high sugar were categorised based on WHO recommendations[27], with very high sugar aligning with the recommendation of limiting daily free sugar intake to approximately 50 g, and high sugar aligning with the extended recommendation to limit daily free sugar intake to 25 g (calculations based on a standard 500–600 ml ready-to-drink beverage). Free sugar is defined as 'monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates'[27]. For the purposes of the current study, this means simple sugars added to beverages and those naturally present within juice. Products in the final sample were assigned unique identifiers for products and their accompanying images.

Data analysis

Beverage labels were analysed through content analysis[28]. Using the definition of BFY features above, we developed a coding framework for the content analysis (see online supplementary material, Supplemental Table 2). The coding framework was based firstly on health and nutrient content claims, as defined by the Food Standards Australia New Zealand Code on Nutrition Health and Related Claims[29], and secondly on relevant literature on food packaging which has suggested that particular features on packages are perceived to imply health benefits. We conducted an initial analysis to refine categories and capture new codes. Through this process, we identified four new codes (superfoods, goodness, wellness and isotonic/hypotonic). The coding framework was further developed and refined through an iterative process that included coding random sub-samples and discussing any issues among the authors until consensus was reached. Before finalising the framework, an independent researcher was engaged to code a random sub-sample (2·5 %) of products and any disagreements or problems with the framework were discussed among the authors until consensus was reached. The final coding framework consisted of thirty-one codes for BFY features which were grouped into eight categories (presented below). Beverage labels were coded by the lead author for the presence or absence of each BFY feature anywhere on the label. At completion, a random sub-sample (10 %) of products was coded by an independent researcher and the percentage agreement was calculated (mean percentage

agreement: 94·5 %; range: 77–100 %). Cohen's κ and other similar inter-rater reliability tests were not used because the underlying assumptions do not fit our data set. The κ statistic corrects for the percentage agreement due to chance agreement, which is assumed to apply to all observed ratings. However, this assumption is problematic when there is a low likelihood of chance agreement, such as when the prevalence of one outcome is high (e.g. large proportion of zeros due to the absence of a characteristic) as was the case in our data set. The nature of our data set aligns well with circumstances in which percentage agreement is an appropriate measure[30].

Results

We identified 1123 unique beverage products, of which 84 % (n 945) contained sugar. The sugar-containing beverages formed the sample for the subsequent analysis. Only 5·2 % (n 49) of the sugar-containing beverages were low in sugar. The mean sugar content of beverages was 8·3 (SD 3·2) g/100 ml and ranged from 1·0 to 16·9 g/100 ml (excluding beverages with missing (n 4) or non-standardised (n 10) reporting of sugar content on labels). Energy drinks had the highest mean sugar content followed by soda and 100 % juices, with a large proportion of beverages within these categories containing a high or very high sugar content (100·0, 96·2 and 98·0 %, respectively). Although coconut waters and iced teas on average had lower amounts of sugar than other beverage categories, over a third of beverages within these categories were high in sugar (see Table 1).

Almost all sugar-containing beverages contained BFY features on their labels (96·8 %), with 90·5 % of packages displaying fruit or vegetable features. When fruit or vegetable features were excluded, BFY features remained on a large proportion of products (87·7 %), with a mean of 3·3 (SD 2·6) unique BFY features per product. Most beverages carried at least one BFY feature (see Table 2). Coconut waters carried the highest number of unique BFY features with an average of eight BFY features per product. Although beverages within the soda and energy drink categories had fewer BFY features on packages, at least one BFY feature was still present on over two-thirds of sodas (68·4 %) and roughly two-thirds of energy drinks (62·1 %).

Better-for-you features

Fruit or vegetables

The majority (86·3 %) of beverages had text referring to fruit or vegetables on their packages and 61·1 % had an image of fruit or vegetables (Table 3). Energy drinks were the only type of beverage on which it was rare for images of fruit or vegetables to be displayed (3·4 %; see online supplementary material, Supplemental Table 3). Fruit drinks and sparkling flavoured waters commonly displayed the servings or percentage of fruit or vegetables on their labels (52·7 and 40·0 %, respectively). Just under a third of beverage labels (29·1 %) mentioned 'superfoods', with the most common superfoods being coconut (8·7 %),

Table 1 Sugar content of sugary beverages by beverage category: South Australian supermarkets (n 17), September–November 2016

Beverage type	No. of beverages (n 931)*,†	Sugar content (g/100 ml)					
		Mean	SD	Low sugar (≥1 and ≤2·5) (%)‡	Medium sugar (>2·5 and <5) (%)‡	High sugar (≥5 and <10) (%)‡	Very high sugar (≥10) (%)‡
Energy drink	29	12	1·7	0·0	0·0	6·9	93·1
Soda	132	11	2·0	0·8	3·0	16·7	79·5
Juice, 100 %	293	10	2·2	0·0	2·0	51·9	46·1
Alcohol substitute	25	9	3·5	0·0	16·0	36·0	48·0
Water, flavoured mineral	50	9	2·3	0·0	10·0	54·0	36·0
Fruit drink	91	8	3·6	8·8	17·6	33·0	40·6
Juice (not 100 %)	33	8	3·1	6·1	9·1	63·6	21·2
Concentrate	83	7	2·5	2·4	13·2	68·7	15·7
Sports drink	39	5	1·3	2·6	15·4	82·0	0·0
Coconut water, flavoured	25	5	1·3	0·0	52·0	48·0	0·0
Iced tea	78	4	2·2	24·3	38·5	37·2	0·0
Coconut water, plain	35	4	1·1	8·6	57·1	34·3	0·0
Water, flavoured still	13	3	1·2	53·8	46·2	0·0	0·0
Other (probiotic drinks)	5	2	0·0	100·0	0·0	0·0	0·0

*Beverages missing sugar content on labels (n 4).
†Beverages removed due to unstandardised reporting of sugar content, i.e. concentrates not as mixed with water (n 10).
‡Reported as percentage of beverage category.

Table 2 Better-for-you (BFY) features on sugary beverage labels by beverage category*,†: South Australian supermarkets (*n* 17), September–November 2016

Beverage type	No. of beverages (*n* 945)	Mean no. of BFY features	SD	Minimum no. of BFY features	Maximum no. of BFY features	Presence of at least one BFY feature (%)‡
Coconut water, flavoured	25	8·0	2·8	3	13	100·0
Coconut water, plain	35	7·9	3·0	1	13	100·0
Iced tea	78	5·5	2·3	1	10	100·0
Sports drink	41	5·1	2·1	3	10	100·0
Juice (not 100 %)	33	3·9	2·3	0	8	90·9
Juices, 100 %	293	3·8	1·8	0	10	97·3
Fruit drink	91	2·7	1·8	0	7	92·3
Water, flavoured still	13	2·3	0·6	1	3	100·0
Water, flavoured mineral	50	1·8	1·6	0	5	80·0
Alcohol substitute	29	1·8	1·5	0	4	79·3
Concentrate	90	1·5	1·4	0	7	67·8
Soda	133	1·2	1·2	0	4	68·4
Energy drink	29	1·0	1·0	0	4	62·1
Other (probiotic drinks)	5	6·0	0·0	6	6	100·0

*Excluding fruit or vegetable features.
†Reported as the occurrence of any one type of feature.
‡Reported as percentage of beverage category.

berries (6·3 %), ginger (6·2 %) and green tea/kombucha (5·4 %). Superfoods were most frequently included on the labels of coconut waters (100·0 % of labels; expected as coconut waters in themselves are considered a superfood), iced teas (59·0 %), juices (45·5 %) and 100 % juices (27·0 %).

Natural

Three-quarters of beverages (76·8 %) contained features that implied they were natural products, by using the term 'natural', 'organic', 'fresh', 'real', 'pure' or 'raw' or by stating an absence of artificial products (i.e. additives, preservatives, colours etc.). All iced teas, over 90 % of coconut waters and 100 % juices, and over 80 % of fruit drinks and juices described their products as natural. Of sodas, 61·7 % also included features on labels that described them as natural, with 31·6 % using the term 'natural' itself and 32·3 % stating an absence of artificial products.

Energy and sugar content

Almost half of the sugar-containing beverages (48·4 %) referred to the product containing lowered, or natural, energy or sugar content, with 'no added sugars' and 'no concentrates' the most frequently used terms. Coconut waters and 100 % juices were the most common types of beverages to carry these features with over 80 % of products displaying one or more feature. More specifically, 78·2 % of 100 % juices and 62·9 % of plain coconut waters contained a no added sugar claim and 40·3 % of 100 % juices and 60·0 % of coconut waters (both plain and flavoured) contained a no concentrates claim. Coconut waters also had no/low-fat or cholesterol claims (60·0 % plain and 76·0 % flavoured). A small number of beverage packages (7·9 %) stated that the product was naturally sweetened or that the sugar was natural or from fruit.

Nutrition

Over a quarter of beverages contained features that focused on nutrition (28·9 %). This was most commonly achieved through referring to specific nutrients (25·6 %) such as 'high in vitamin C'. Although this occurred across beverage types, it was most often used on sports drinks (68·3 %) and coconut waters (60·0 % flavoured and plain). Beverages also used broad terms such as 'nutritious'/'nourishing' (5·7 %) and this was most common on juices (27·3 % of juices and 12·3 % of 100 % juices).

Health

Fifteen per cent of beverages contained features that were specifically related to health and well-being. Broad terms such as 'health'/'healthy' were present most often on iced tea packages (32·1 %) and coconut waters (28·6 % plain and 16·0 % flavoured), and terms such as 'wellness'/'well-being' or 'revitalise'/'refresh' were most common on energy drinks (27·6 %), alcohol substitutes (24·1 %) and juices (24·2 %). References to specific health effects (e.g. claims about metabolism, cardiovascular/muscle function, immune system or digestive health) were less common; when present, these were most commonly found on juices (18·2 %) and iced teas (12·8 %).

Goodness

Fifteen per cent of beverages used the term 'goodness' (e.g. 'full of goodness' or 'the goodness of blueberry'). This was most commonly used on juice labels (60·6 % of juices

Table 4 Better-for-you (BFY) features on sugary beverage labels by sugar content: South Australian supermarkets (*n* 17), September–November 2016

		BFY feature category/code (%)*										
Sugar content (g/100 ml)	No. of beverages (*n* 931)†‡	Fruit or vegetables	Natural	Energy/ sugar	No added sugar	Naturally sweetened/sugar from fruit	Nutrition	Health	Goodness	Dietary restrictions	Sport	Any BFY feature§
Low sugar (≥1 and ≤2·5)	48	97·9	85·4	85·4	27·1	10·4	41·7	39·6	14·6	31·3	8·3	100·0
Medium sugar (>2·5 and <5)	124	98·4	87·1	63·7	21·8	15·3	41·1	44·4	15·3	28·2	28·2	99·2
High sugar (≥5 and <10)	405	92·8	77·5	49·4	35·6	10·1	26·4	7·9	19·8	13·1	13·8	89·4
Very high sugar (≥10)	354	85·3	73·2	37·9	32·8	2·8	26·3	9·9	9·3	5·6	2·0	81·6

*Reported as percentage of beverages within sugar category displaying feature category/code.
†Beverages missing sugar content on labels (*n* 4).
‡Beverages removed due to unstandardised reporting of sugar content, i.e. concentrates not as mixed with water (*n* 10).
§Excluding fruit or vegetable category.

labels in a range of ways that appeal to varying levels of consumer consciousness. Fruit or vegetable flavours and images were highly prevalent across beverage types, implicitly associating the beverages with being natural. On the other hand, while listing the servings of fruit and vegetables in a beverage was less prevalent, this more explicitly associated beverages with being natural, and nutritious, equating the consumption of juice to that of whole foods.

Promoting the absence of artificial (non-natural) products on labels was another common way through which beverages were positioned as natural. Claims such as 'no artificial products, colours or flavours' can often be, and were, applied across beverage categories, including beverages such as sodas which could otherwise be considered inherently unhealthy.

Sugar-containing beverages are positioned as a source of nutrition

Altering the nutritional profile of foods and beverages through reformulation and fortification can be used by manufacturers to market products as a source through which nutrition is delivered[34]. Reformulation can be used to reduce the nutrients perceived by consumers as 'bad' for health and fortification increases the nutrients perceived as 'good' for health[34]. In our study, both of these strategies were used to promote sugar-containing beverages with labels addressing the sugar and vitamin/mineral content of beverages.

Sugar is a nutrient of increasing concern to consumers[6,7]. Our study found that labels address concerns about sugar by favourably positioning the sugar content of beverages, most commonly though 'no added sugar' claims which were present on just under a third of labels. Beverages that included 'no added sugar' claims on their labels were still high in sugar, specifically free sugar. Notably problematic in this regard is 100 % juices, with over three-quarters of the 100 % juices in our sample making a 'no added sugar' claim, while the mean sugar content of the category was surpassed only by soda and energy drinks.

Fortification of sugar-containing beverages can also be used to draw consumer attention towards positive nutrients rather than high sugar content. As such, the use of fortification positions these non-core (discretionary) products as a source of nutrients. This was evident on a quarter of labels which referred to the nutrient content of beverages, for example through claiming high vitamin and mineral content.

Sugar-containing beverages are positioned as providing functional benefits

Functionalism extends the concept of fortification from meeting adequate nutrient intake to providing optimal nutrition for enhanced health or bodily functions[34]. Functional beverages are often perceived to be novel and technological, invoking science through reference to

Table 3 Better-for-you (BFY) features on sugary beverage labels: South Australian supermarkets (*n* 17), September–November 2016

BFY feature category/ code	No. of beverages (*n* 945)	Proportion of beverages (%)
Fruit or vegetables	855	90·5
Fruit/vegetables in text	816	86·3
Images of fruit/vegetables	577	61·1
Superfoods	275	29·1
Servings or % fruit/ vegetables	173	18·3
Natural	726	76·8
No artificial products	576	61·0
Natural	316	33·4
Pure or raw	152	16·1
Fresh	119	12·6
Real	115	12·2
Organic	111	11·7
Energy and sugar content	457	48·4
No added sugar	300	31·7
No concentrates	176	18·6
Naturally sweetened/ sugar from fruit	75	7·9
Low kilojoules	51	5·4
No/low fat or cholesterol	42	4·4
Low/reduced sugar or % sugar-free	40	4·2
Unsweetened	3	0·3
Nutrition	273	28·9
Listed specific nutrients	242	25·6
Nutritious or nutritional	54	5·7
Health	143	15·1
Wellness	87	9·2
Health/healthy	72	7·6
Health effects	36	3·8
Goodness	139	14·7
Dietary restrictions	123	13·0
Gluten free	98	10·4
Vegetarian or vegan	51	5·4
Dairy/lactose free	26	2·8
Sport	104	11·0
Hydration or rehydrate	79	8·4
Electrolytes	70	7·4
Sport or exercise	59	6·2
Isotonic or hypotonic	24	2·5
Performance	12	1·3

and 22·2% of 100% juices), iced teas (30·8%) and sparkling flavoured waters (24·0%).

Dietary restrictions

A small number of products noted that the beverage was suitable for people with dietary restrictions (13·0%), with gluten free being the most common (10·4%). Flavoured coconut waters were the most likely to indicate that they were suitable for a range of dietary restrictions such as gluten free, vegan and lactose free, with 60·0% containing at least one or more (37·1% in plain coconut waters), followed by iced teas which had 43·6% of products containing one or more feature per package.

Sport

Although there were relatively few sporting features on beverage packages across the sample (11·0%), all sports drinks contained sporting features and specifically referenced sport or exercise, with other commonly used features on sports drinks being electrolytes (100·0%) and hydration (78·0%). In addition, most coconut waters also displayed sporting features on packages (88·0% of flavoured and 77·1% of plain), often through reference to hydration (68·0% of flavoured and 68·6% of plain) and electrolytes (52·0% of flavoured and 45·7% of plain), and less commonly through direct reference to sport or exercise (24·0% of flavoured and 8·6% of plain). Almost one quarter of energy drinks (24·1%) used references to sport.

Better-for-you features and sugar content

Most beverages with high or very high sugar content (*n* 759) carried a BFY feature on their label (85·8%; Table 4). Of these beverages with high and very high amounts of sugar, 44·0% displayed a BFY feature related to energy or sugar content. Specifically, 34·3% of beverages with high and very high amounts of sugar displayed a no added sugar claim on the label and 6·7% indicated that the beverage was naturally sweetened or that the sugar was from fruit.

Discussion

The current study found BFY features present on 96·8% of sugar-containing beverage labels, with an average of 3·3 unique features per label. These features align products with being natural, emphasise their fruit and vegetable content, emphasise other nutrient contents, favourably position sugar content and suggest functional properties for the beverages. By using these BFY features, beverages may be given a 'health halo'[20].

Sugar-containing beverages are positioned as natural

Positioning beverages as natural appears to be at the centre of current BFY advertising, with over three-quarters of beverages in our study displaying natural features on their labels. Advertising products as natural is not new or unusual. Nature is often used to position products as intrinsically good, healthy, fresh and innocent[31]. The commodification of nature has previously been documented for bottled water[32] and foods[31]. Our study shows that manufacturers are positioning sugar-containing beverages in the same way, with coconut waters, iced teas and juices heavily using natural connotations on labels. Using the key word 'natural' was the most direct way this association was achieved with a third of packages doing so.

The frequent presence of fruit and vegetables on sugar-containing beverage labels also associates these beverages with being natural. The Coca-Cola Company has previously reported its efforts to 'capture the natural goodness of fruit and vegetables for beverage use'[33], highlighting the importance of this positioning for advertising beverages. In our study, fruit and vegetables were present on

physiological functions and health[35]. Although functional beverages comprise a relatively small segment of the market, their popularity is increasing[36]. Our study found that functionalism was advertised in two ways on beverage labels.

First, sports drink labels promoted functional benefits associated with achieving optimal sporting performance. Sports drink labels advertised electrolytes and the provision of optimal hydration for sporting performance. Scientific terms such as 'isotonic' and 'hypotonic' accompanied this positioning, further illustrating the scientific and functional positioning of these beverages.

Second, coconut waters were positioned as a 'natural' functional beverage, with the labels advertising electrolyte content and hydration. Unlike sports drinks, few coconut water labels made direct reference to sport and exercise. Linking functional benefits with the idea of being natural, coconut waters capitalised on the purported benefits of electrolyte consumption (namely, sporting performance) and appealed to consumers who desire natural products.

Positioning high sugar beverages as better-for-you is misleading to consumers

Prior research on consumer evaluation of beverages for health purposes is limited and has not explored how beverages are being positioned as healthy[37]. However, existing research on positioning foods as healthy or BFY suggests that many advertising features we identified on beverages align with how consumers evaluate a product as healthy. For example, Luomala *et al.* have shown how positioning a food as natural influences consumers' opinions on whether the food is healthy or not[38]. Irmak *et al.* found that renaming candy from 'candy chews' to 'fruit chews' can influence the health beliefs, and consumption, of candy[39]. Using BFY features on labels may therefore influence consumers' assessment of whether sugar-containing beverages are healthy, or healthier than other options.

Positioning beverages that contain high amounts of free sugar as BFY is potentially misleading. BFY features on labels disregard the source through which the purported benefits are being delivered[40] and distract from the harms associated with consuming products high in free sugars[27]. For example, advertising that juice contains 'no added sugar' or 'natural' sugar from fruit and vegetables distracts from the high free sugar content of these beverages. Through positioning sugar-containing beverages as BFY, consumers may be influenced to select products they believe are health-promoting, which are in fact potentially harmful when overconsumed.

Public health implications

Our study has highlighted the ways in which sugar-containing beverages are being advertised as healthy on labels. The predominance of BFY features on these beverages further suggests that consumers are becoming increasingly concerned about health[7], particularly in regard to sugar consumption from beverages[6]. Increased public concern around sugar consumption from beverages is a positive indicator for public health outcomes and it is not surprising that beverage manufacturers are implementing efforts to address this concern. Originally intended for improving public health, reformulation and fortification of foods and beverages has also been adopted by manufacturers and is a common technique used for advertising purposes[34]. However, the use of natural ingredients, increased vitamin and minerals and 'functional ingredients', as advertised on sugar-containing beverage labels in our study, does not offset the harms associated with high sugar consumption[27] from these beverages. Reformulation that leads to positive public health outcomes in obesity and related non-communicable diseases is likely to occur only through significant reduction in the sugar content of these beverages. Knowledge of the techniques used to position sugar-containing beverages as BFY can inform the development of public messaging that aims to increase community literacy and reduce population overconsumption of free sugars including sugar-containing beverages.

Our study has also highlighted that the positioning of sugar-containing beverages as BFY occurs despite existing regulations that aim to prevent the misleading advertising of unhealthy products as healthy[29]. We found that it was most common for implicit BFY features (such as fruit flavours and advertising natural ingredients) to be displayed on sugar-containing beverages. Research has demonstrated that implicit health-related labelling features, such as product titles[20] and colour[21], increase consumer perceptions of the healthfulness of discretionary foods. It has further been suggested that implicit features have a stronger effect on consumer health perceptions than explicit nutrition claims through creating a health halo effect[20]. The prominence and effect of implicit health- and nutrition-related features, such as the BFY features identified in our study, therefore need to be considered in existing and future regulations, for example through broadening the scope of what is regulated. Such regulations can be further strengthened by restricting the use of all health- and nutrition-related features on labels to non-discretionary foods and beverages. Australia has implemented such restrictions for health claims, with foods and beverages being required to meet a predefined nutrient profile score to be eligible to display health claims[11]. These restrictions have not been extended to nutrition claims, which may explain why a quarter of sugar-containing beverages advertised the presence of specific nutrients on labels.

Limitations

We restricted our study to the labels of water-based sugar-containing beverages, excluding milk-based beverages

which may also be high in added sugar. Milk-based beverages may use different BFY features on their labels that were not identified in our study; analysis of the advertising features on sweetened milk labels would be complementary to our research. We also focused on advertising through labels, which may differ from advertising through other media. Further, while we have defined and measured BFY features on labels, our analysis cannot determine whether these features influence how people evaluate these beverages. The BFY features identified in the present study should be tested in experimental research to explore the effect of these features on consumers' perceptions and consumption of sugar-containing beverages.

Conclusion

Many sugar-containing beverage labels include features that imply these drinks are healthy, or healthier than alternative beverages. If BFY features lead consumers to believe these beverages are healthy, this may influence consumption, with consequent negative implications for the health of the public. Those working in obesity prevention and public health must find ways to counter and/or prevent the misleading advertising of sugar-containing beverages as healthy.

Acknowledgements

Financial support: Funding for this study was provided by an Australian Government Research Training Program Scholarship (A.L.B.) and an Ian Wilson Liberal Research Scholarship (A.L.B). The funders were not involved in the study design, analysis and interpretation of data, thus the authors were independent of the funder. It was the authors' decision to publish the findings of this study and the funders were not involved in the preparation of this manuscript. *Conflict of interest:* None. *Authorship:* A.L.B. developed the coding tool and collected and analysed the data, with scientific input from C.L.M. and A.J.B.-M. A.L.B. drafted the article. All authors contributed to the conceptualisation and design of the study and reviewed and revised the final version of the article. *Ethics of human subject participation:* This research project was exempt from review by a Human Research Ethics Committee as no human data were used and the research did not pose any foreseeable risk of harm or discomfort.

Supplementary material

To view supplementary material for this article, please visit https://doi.org/10.1017/S1368980018002392

References

1. Malik VS, Pan A, Willett WC *et al.* (2013) Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *Am J Clin Nutr* **98**, 1084–1102.
2. Imamura F, O'Connor L, Ye Z *et al.* (2016) Consumption of sugar sweetened beverages, artificially sweetened beverages, and fruit juice and incidence of type 2 diabetes: systematic review, meta-analysis, and estimation of population attributable fraction. *Br J Sports Med* **50**, 496–504.
3. Malik VS, Popkin BM, Bray GA *et al.* (2010) Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. *Circulation* **121**, 1356–1364.
4. Bernabe E, Vehkalahti MM, Sheiham A *et al.* (2014) Sugar-sweetened beverages and dental caries in adults: a 4-year prospective study. *J Dent* **42**, 952–958.
5. Popkin BM & Hawkes C (2016) Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. *Lancet Diabetes Endocrinol* **4**, 174–186.
6. Euromonitor International (2016) Better for you beverages in Australia. http://www.euromonitor.com/better-for-you-beverages-in-australia/report (accessed August 2016).
7. Amplify Snack Brands (2017) Better-for-you snacks: the new snacking reality. https://amplifysnackbrands.com/documents/Amplify-2017-Snack-Study.PDF (accessed August 2017).
8. PepsiCo (2018) Explore PepsiCo brands: Better for you. http://www.pepsico.com/Brands/BrandExplorer#better-for-you (accessed July 2018).
9. Obesity Solutions Initiative (2011) *Better-for-You Foods. It's Just Good Business*. Washington, DC: Hudson Institute.
10. Campos S, Doxey J & Hammond D (2011) Nutrition labels on pre-packaged foods: a systematic review. *Public Health Nutr* **14**, 1496–1506.
11. Food Standards Australia New Zealand (2016) *Australia New Zealand Food Standards Code – Standard 1.2.7 – Nutrition, Health and Related Claims*. Canberra, ACT: Federal Register of Legislation, Australian Government.
12. Abrams KM, Evans C & Duff BR (2015) Ignorance is bliss. How parents of preschool children make sense of front-of-package visuals and claims on food. *Appetite* **87**, 20–29.
13. Dean M, Lahteenmaki L & Shepherd R (2011) Nutrition communication: consumer perceptions and predicting intentions. *Proc Nutr Soc* **70**, 19–25.
14. Williams P (2005) Consumer understanding and use of health claims for foods. *Nutr Rev* **63**, 256–264.
15. Gorton D, Mhurchu CN, Bramley D *et al.* (2010) Interpretation of two nutrition content claims: a New Zealand survey. *Aust N Z J Public Health* **34**, 57–62.
16. Kaur A, Scarborough P & Rayner M (2017) A systematic review, and meta-analyses, of the impact of health-related claims on dietary choices. *Int J Behav Nutr Phys Act* **14**, 93.
17. Elliott C (2016) *How Canadians Communicate VI: Food Promotion, Consumption, and Controversy*. Edmonton, AB: Athabasca University Press.
18. Franco-Arellano B, Bernstein JT, Norsen S *et al.* (2017) Assessing nutrition and other claims on food labels: a repeated cross-sectional analysis of the Canadian food supply. *BMC Nutr* **3**, 74.
19. Christoforou A, Dachner N, Mendelson R *et al.* (2018) Front-of-package nutrition references are positively associated with food processing. *Public Health Nutr* **21**, 58–67.
20. Fernan C, Schuldt JP & Niederdeppe J (2018) Health halo effects from product titles and nutrient content claims in the context of 'protein' bars. *Health Commun* **33**, 1425–1433.
21. Schuldt JP (2013) Does green mean healthy? Nutrition label color affects perceptions of healthfulness. *Health Commun* **28**, 814–821.

22. Roy Morgan Research (2016) Supermarket sweep: ALDI's share of the Aussie market still rising. http://www.roymorgan.com/findings/6762-supermarket-sweep-aldis-share-of-aussie-market-still-rising-201604142258 (accessed July 2016).
23. Australian Bureau of Statistics (2013) Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011. http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2011~Main%20Features~Main%20Page~1 (accessed July 2016).
24. Williams P, Yeatman H, Ridges L *et al.* (2006) Nutrition function, health and related claims on packaged Australian food products – prevalence and compliance with regulations. *Asia Pac J Clin Nutr* **15**, 10–20.
25. Dachner N, Mendelson R, Sacco J *et al.* (2015) An examination of the nutrient content and on-package marketing of novel beverages. *Appl Physiol Nutr Metab* **40**, 191–198.
26. Rayner M, Wood A, Lawrence M *et al.* (2013) Monitoring the health-related labelling of foods and non-alcoholic beverages in retail settings. *Obes Rev* **14**, Suppl. 1, 70–81.
27. World Health Organization (2015) *Guideline: Sugar Intake for Adults and Children*. Geneva: WHO.
28. Kondracki NL, Wellman NS & Amundson DR (2002) Content analysis: review of methods and their applications in nutrition education. *J Nutr Educ Behav* **34**, 224–230.
29. Food Standards Australia New Zealand (2016) *Australia New Zealand Food Standards Code – Schedule 4 – Nutrition, Health and Related Claims*. Canberra, ACT: Federal Register of Legislation, Australian Government.
30. Feng GC (2013) Underlying determinants driving agreement among coders. *Qual Quant* **47**, 2983–2997.
31. Hansen A (2002) Discourses of nature in advertising. *Communications* **27**, 499–511.
32. Opel A (1999) Constructing purity: bottled water and the commodification of nature. *J Am Cult* **22**, 67–76.
33. Short D (2005) When science met the consumer: the role of industry. *Am J Clin Nutr* **82**, 1 Suppl., 256S–258S.
34. Scrinis G (2016) Reformulation, fortification and functionalization: Big Food corporations' nutritional engineering and marketing strategies. *J Peasant Stud* **43**, 17–37.
35. Eden S (2009) Food labels as boundary objects. *Public Underst Sci* **20**, 179–194.
36. Siro I, Kapolna E, Kapolna B *et al.* (2008) Functional food. Product development, marketing and consumer acceptance – a review. *Appetite* **51**, 456–467.
37. Kim H & House LA (2014) Linking consumer health perceptions to consumption of nonalcoholic beverages. *Agric Resour Econ Rev* **43**, 1–16.
38. Luomala H, Jokitalo M, Karhu H *et al.* (2015) Perceived health and taste ambivalence in food consumption. *J Consum Mark* **32**, 290–301.
39. Irmak C, Vallen B & Robinson SR (2011) The impact of product name on dieters' and nondieters' food evaluations and consumption. *J Consum Res* **38**, 390–405.
40. Scrinis G (2013) *Nutritionism. The Science and Politics of Dietary Advice*. New York: Columbia University Press.

Appendix B – Study 1 published manuscript 2

Received: 23 February 2018 | Accepted: 24 August 2018
DOI: 10.1002/hpja.197

BRIEF REPORT

WILEY Health Promotion Journal of Australia

Health Star Ratings: What's on the labels of Australian beverages?

Abstract

Issue addressed: The Health Star Rating (HSR) System provides a useful tool to communicate health and nutrition messages to consumers. Given the large contribution from sugar-containing beverages to sugar intake in the Australian diet and the adverse health outcomes associated with frequent consumption, it is important to investigate how the HSR System is displayed on beverages. Our research measured and compared the presence of the HSR System on the labels of sugar-containing and sugar-free beverages in Australia.

Methods: We conducted a survey of the labels on 762 ready-to-drink (≤600 mL) nondairy/nonalcoholic beverages, sampled from 17 South Australian supermarkets in late 2016. We measured the presence of a star rating icon or an energy-only icon (which is an option of the HSR System for beverages).

Results: The HSR System was observed on 35.3% of beverages, with only 6.8% displaying a star rating icon and 28.5% displaying an energy-only icon. When present (n = 52), star rating icons were almost universally 5 stars (94.2%), and of these, they were predominantly displayed on 100% juices (85.7%). Almost all beverages with a star rating contained high amounts of sugar; only three sugar-free beverages displayed a star rating.

Conclusion: We found that there are low uptake and limited use of the HSR System on beverages.

So what? The HSR System on beverages could better achieve its objectives if the energy-only icon were removed from the graphic options, the algorithm were adjusted so that 100% juices cannot display a 5-star rating, and the System were made mandatory.

1 | INTRODUCTION

Introduced to Australia in 2014, the Health Star Rating (HSR) System is a voluntary front-of-pack labelling system that aims to assist consumers in making healthier food choices.[1] The System uses an algorithm to derive a score, displayed in the form of a "star rating," that ranges from 0.5 stars (indicating the least healthy) to 5 stars (indicating the healthiest option).[1] The System has five graphic options,[1,2] four of which incorporate a star rating icon (Figure 1A). The fifth is an energy-only icon (Figure 1B) permitted "for small pack sizes and some confectionery and beverage products."[1] Plain packaged water is exempt from using the algorithm and receives an automatic 5-star rating.[1]

Research on the HSR System has predominantly focused on its effectiveness compared to other front-of-pack labelling systems[3–5] and modelling of the star ratings that can be displayed on products if the manufacturer chooses to do so,[6,7] rather than real-world observations of use of the System in retail settings.[6,8] A study by Lawrence et al[6] examined how the display of the HSR System differed between core and discretionary foods.[6] This research only reported the display of the System on water and not across the entire beverage category.[6] Further, a 2015-2016 progress review on the HSR System reported lower uptake on beverages than foods.[8] Lower uptake of the System for beverages may be due to the discretionary nature of most beverages, which would result in a low number being able to score a favourable high star rating. The progress review did not distinguish between the use of the System on sugar-containing compared to sugar-free beverages and did not measure the presence of the energy-only icon on beverage labels.[8] Gaps therefore remain in our understanding of the current use of the HSR System on beverages in Australia.

Given the significant role sugar-sweetened beverages play in contributing excess free sugar to the Australian diet,[9] and risk to metabolic[10] and dental health,[11] investigation of the use of the HSR System on beverages is warranted. This study aimed to measure the presence of the HSR System on beverage labels. We sought to compare the presence of the System on sugar-containing and sugar-free beverages and the use of the star rating icon compared to the energy-only icon. Sugar-containing beverages include beverages with both "added" and "free" sugars (ie, sugar from 100% juice) which the World Health Organization recommend limiting due to their contribution to excess energy intake and increased risk for noncommunicable diseases.[12]

FIGURE 1 Health Star Rating System graphics. A, Star rating icon; B, Energy-only icon

2 | METHODS

We conducted a survey of the labels on packaged nondairy/nonalcoholic beverages (defined as Category 1 Beverages for the HSR System)[13] between September and November 2016. Alcoholic beverages were excluded as they are prohibited from displaying the HSR System. Dairy beverages are categorised separately in the HSR System as they contain macronutrients that substantially alter their nutrient profile compared to other beverages and use of the HSR System on dairy beverages has previously been documented.[14] We therefore excluded dairy beverages from the study.

We limited our sample to beverages that were ready-to-drink (RTD; defined as ≤600 mL in volume). Non-English packages and duplicates were excluded. Multiple package sizes of the same product were also excluded after preliminary analyses found no difference in labels across package sizes. The method of data collection was based on similar studies.[15-17] The sampling frame was 17 South Australian stores purposefully selected from four leading Australian supermarket chains across different geographical and socio-economic areas.[18] Beverage labels were photographed in store. The study was granted an exemption from Human Research Ethics Committee review.

The final sample was 762 RTD beverages. Beverages were coded for type of beverage (*alcohol substitute [ie, sparkling apple or grape juices with "nonalcoholic" displayed on the front of label], coconut water [flavoured or plain], energy drink, fruit drink, iced tea, juice [100% juice separated], soft drink, sports drink, flavoured water [still or sparkling] and other*) and categorised as either sugar-free (<1 g/100 mL) or sugar-containing (≥1 g/100 mL). Sugar-containing beverages were further categorised by sugar content. Although other categories for sugar content of beverages have been defined for use with front-of-pack nutrition labelling,[19,20] we defined sugar categories conservatively to align with recommendations for free sugar intake made by the World Health Organization.[12] Sugar content was categorised as low sugar (≥1 and ≤2.5 g/100 mL),[21] medium sugar (>2.5 and <5 g/100 mL), high sugar (≥5 g/100 mL and <10 g/100 mL) and very high sugar (≥10 g/100 mL).[1] The presence of a star rating icon or the energy-only icon was recorded. Descriptive analyses were undertaken.

3 | RESULTS

Of beverages surveyed, 35.3% displayed the HSR System on their label (Table 1). It was more common for beverages to display the energy-only icon (28.5%) than a star rating icon (6.8%). Overall 24% of sugar-free beverages (n = 129) displayed the energy-only icon, and 2.3% displayed a star rating icon. Similarly, 29.4% of sugar-containing beverages (n = 633) displayed the energy-only icon while 7.8% displayed a star rating icon. For sugar-containing beverages, 69% of energy drinks (n = 29), 62.5% of noncarbonated flavoured water (n = 8) and 55.2% of sports drinks (n = 29) displayed the energy-only icon.

When a star rating icon was present (n = 52), beverages universally displayed either a 5-star rating (94.2%) or a 4.5-star rating (5.8%). Of these beverages, three were no sugar waters, one was low sugar (one plain coconut water), three were medium sugar (flavoured coconut waters), and the remaining 45 beverages were 100% juices, with either high (68.9%) or very high (31.1%) sugar content.

4 | DISCUSSION

Our findings highlight gaps and missed opportunities in Australia's HSR System with practical implications for our System and other countries looking to adopt like systems. Only beverages within the RTD category that were able to score the highest HSR of 4.5 and 5 stars displayed the star rating icon on labels. This is much higher than the 1.5 average star rating that beverages would receive if the System were universally adopted or compulsory.[7] It also differs from the wide range of star ratings (0.5-5 stars) that have previously been observed across the whole beverage category in New Zealand, that is, including larger "sharing" size bottles.[8] These differences may be the result of differing methodology. Unlike our study, the New Zealand sample included larger sized packages, including store brands known to have adopted the HSR universally.

Given that the HSR System aims to guide consumers in making healthier choices,[5] it is concerning that the System is used more frequently on sugar-containing beverages than on unflavoured waters. Only 1 of 51 unflavoured waters displayed a 5-star rating, despite all being eligible to do so. This appears to be a missed opportunity on behalf of water manufacturers.

We also found that almost one in four (24%) 100% juice beverages displayed a 5-star rating on labels. The eligibility for 100% juices to score a 5-star rating has previously been highlighted as an anomaly of the System.[6] While it can be argued that 100% juices are included in the current Australian Dietary Guidelines, which state 125 mL may contribute to a serve of fruit "occasionally,"[22] the current HSR scoring that allows 5 stars on a 600-mL RTD bottle of juice likely to be consumed in one sitting does not align with these recommendations.[6] Further, given that both plain bottled water and 100% juices are eligible to display a 5-star rating icon, the System is not clearly communicating the Guideline recommendations to limit juice consumption and choose water.[22] Such scoring may act to reinforce perceptions that 100% juices are healthy[21-25] rather than communicating that they are high in sugar.[26]

Our results also show that beverage manufacturers are favouring the energy-only icon option of the HSR System over the star rating icon by a factor of 4 to 1. While the two-year review on the HSR System did not report the use of the energy-only icon on beverages, it reported that the energy-only icon is used less often than the star rating icon across food products.[8] Our results indicate that this is not the case for beverages. Although use of the energy-only icon is in accordance with the current HSR guidelines, the star rating icon is considered the most useful aspect of the HSR System for guiding

TABLE 1 Health Star Rating (HSR) System on ready-to-drink (≤600 mL) beverages

Beverage type	n	Sugar-free beverages				Sugar-containing beverages				Sugar content (g/100 mL) of beverages with 4.5- or 5-star rating icon				
		n	No icon %	Energy-only icon %	5-star rating icon[a] %	n	No icon %	Energy-only icon %	4.5- or 5-star rating icon[a] %	n	Low sugar (≤2.5) %	Medium sugar (>2.5 < 5) %	High sugar (≥5 < 10) %	Very high sugar (≥10) %
Juice, 100%	177	0	0	0	0	177	59.9	14.7	25.4[b]	45[b]	0	0	68.9	31.1
Soft drink	143	14	57.1	42.9	0	129	58.1	41.9	0	0	0	0	0	0
Iced tea	86	8	75.0	25.0	0	78	62.8	37.2	0	0	0	0	0	0
Fruit drink	64	0	0	0	0	64	81.3	18.8	0	0	0	0	0	0
Water, flavoured mineral	48	13	53.8	46.2	0	35	57.1	42.9	0	0	0	0	0	0
Energy drink	41	12	41.7	58.3	0	29	31.0	69.0	0	0	0	0	0	0
Sports drink	38	9	66.7	33.3	0	29	44.8	55.2	0	0	0	0	0	0
Water, plain still	34	34	91.2	5.9	2.9	0	0	0	0	1	100.0	0	0	0
Juice	30	1	100.0	0	0	29	82.8	17.2	0	0	0	0	0	0
Water, flavoured still	29	21	85.7	4.8	9.5	8	37.5	62.5	0	2	100.0	0	0	0
Coconut water, plain	24	0	0	0	0	24	83.3	12.5	4.2	1	100.0	0	0	0
Coconut water, flavoured	21	0	0	0	0	21	81.0	4.8	14.3	3	0	100.0	0	0
Water, plain sparkling	17	17	76.5	23.5	0	0	0	0	0	0	0	0	0	0
Alcohol substitute	5	0	0	0	0	5	100.0	0	0	0	0	0	0	0
Other	5	0	0	0	0	5	100.0	0	0	0	0	0	0	0
Total	762	129	73.6	24.0	2.3	633	62.9	29.4	7.8	52	7.7	5.8	59.6	26.9

[a]Only 5-star rating icons were displayed on sugar-free beverages and 4.5- and 5-star rating icons displayed on sugar-containing beverages.
[b]Three beverages (6.7%) had a 4.5- rather than 5-star rating icon.

consumers to healthier options.[3,4] It is therefore questionable whether the limited use of the star rating icon and the concurrent use of the energy-only icon on beverages meet the HSR System's aim of enabling direct and readily understandable comparisons between products from the beverage category.[2]

5 | LIMITATIONS

It is important to note that our study is limited to the beverages available for sale at the time of the survey within our sampling frame (September to November 2016). The consumer market evolves constantly and new beverages will become available and label designs will change. Further, while we have measured the presence or absence of the HSR System, we have not assessed how this influences consumers' interpretation or choice of beverages.

6 | CONCLUSION

We found that there is low uptake of the HSR System on beverages in Australian supermarkets. Firstly, only beverages that can score a high star rating displayed a star rating icon on labels, and many do so despite containing large amounts of sugar. Conversely, most sugar-free beverages, including waters, are not taking the opportunity to display a star rating icon. Making the HSR System mandatory so that all beverages are required to display the System would address this skew. Secondly, a number of 100% juices are displaying a 5-star rating. The HSR System's scoring for beverages should be adjusted so that 100% juices which are high in free sugar will not receive a 5-star rating, and this rating should be reserved for the healthiest beverage option, water. Lastly, beverage manufacturers often choose to display the energy-only icon over the star rating icon. Given that the star rating icon is the most useful element of the HSR System and the energy-only icon is not comparable to the star rating, the energy-only icon should be removed as an option from the HSR System.

ACKNOWLEDGEMENTS

Funding in the present study was provided by an Australian Government Research Training Program Scholarship and an Ian Wilson Liberal Research Scholarship. The funders had no involvement in the study design; analysis and interpretation of data; thus, the authors were independent of the funder.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

Keywords
Australia, beverages, diet, food and nutrition, food packaging, health policy, product labelling

ORCID

Aimee L. Brownbill http://orcid.org/0000-0002-3368-3907
Annette Braunack-Mayer http://orcid.org/0000-0003-4427-0224
Caroline Miller http://orcid.org/0000-0001-9723-8047

Aimee L. Brownbill BHSc (Hons)[1,2]
Annette Braunack-Mayer PhD, BMedSci (Hons)[1,3]
Caroline Miller PhD[1,2]
[1]*School of Public Health, The University of Adelaide, Adelaide, SA, Australia*
[2]*Population Health, South Australian Health and Medical Research Institute (SAHMRI), Adelaide, SA, Australia*
[3]*School of Health and Society, University of Wollongong, Wollongong, NSW, Australia*

Correspondence
Aimee L. Brownbill, School of Public Health, The University of Adelaide, Adelaide, SA, Australia.
Email: aimee.brownbill@adelaide.edu.au

ENDNOTE

[1] High and very high sugar categorisation was based on World Health Organization recommendations, with very high sugar aligning with the recommendations of limiting daily free sugar intake to approximately 50 g and high sugar aligning with extended recommendations to limit daily free sugar intake to 25 g. Calculations were based on a standard 500-600 mL RTD beverage.

REFERENCES

1. Australian Government Department of Health. Health Star Rating System style guide. Canberra: Australian Government Department of Health; 2016(Version 4).
2. Health Star Rating Advisory Committee. Discussion paper - five year review of the Health Star Rating System. 2017.
3. Pettigrew S, Talati Z, Miller C, Dixon H, Kelly B, Ball K. The types and aspects of front-of-pack food labelling schemes preferred by adults and children. Appetite. 2017;109:115–23.
4. Talati Z, Pettigrew S, Kelly B, Ball K, Dixon H, Shilton T. Consumers' responses to front-of-pack labels that vary by interpretive content. Appetite. 2016;101:205–13.
5. Talati Z, Norman R, Pettigrew S, et al. The impact of interpretive and reductive front-of-pack labels on food choice and willingness to pay. Int J Behav Nutr Phys Act. 2017;14(1):171.
6. Lawrence M, Dickie S, Woods J. Do nutrient-based front-of-pack labelling schemes support or undermine food-based dietary guideline recommendations? Lessons from the Australian Health Star Rating System. Nutrients. 2018;10(1):32.
7. Peters S, Dunford E, Jones A, et al. Incorporating added sugar improves the performance of the Health Star Rating front-of-pack labelling system in Australia. Nutrients. 2017;9(7):701.
8. Health Star Rating Advisory Committee. Two year progress review report on the implementation of the Health Star Rating System–June 2014–June 2016. 2017 [Cited 2017 July 21]. Available from: http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/reviews.
9. Australian Bureau of Statistics. Australian Health Survey: consumption of added sugars. Australia 2011-12. Canberra; 2016.

10. Bernabe E, Vehkalahti MM, Sheiham A, Aromaa A, Suominen AL. Sugar-sweetened beverages and dental caries in adults: a 4-year prospective study. J Dent. 2014;42:952–8.
11. Malik VS, Popkin BM, Bray GA, Despres JP, Hu FB. Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. Circulation. 2010;121:1356–64.
12. World Health Organization. Guideline: Sugar intake for adults and children. Geneva: World Health Organization; 2015.
13. Commonwealth of Australia. Guide for industry to the Health Star Rating Calculator (HSRC). Version 5. Jun 2016.
14. Wellard L, Hughes C, Watson WL. Investigating nutrient profiling and Health Star Ratings on core dairy products in Australia. Public Health Nutr. 2016;19:2860–5.
15. Williams P, Yeatman H, Ridges L, et al. Nutrition function, health and related claims on packaged Australian food products-prevalence and compliance with regulations. Asia Pac J Clin Nutr. 2006;15(1):10–20.
16. Dachner N, Mendelson R, Sacco J, Tarasuk V. An examination of the nutrient content and on-package marketing of novel beverages. Appl Physiol Nutr Metab. 2015;40(2):191–8.
17. Rayner M, Wood A, Lawrence M, et al. Monitoring the health-related labelling of foods and non-alcoholic beverages in retail settings. Obes Rev. 2013;14(Suppl 1):70–81.
18. Australian Bureau of Statistics. Census of population and housing: socio-economic indexes for areas (SEIFA), Australia, 2011. Canberra, Australia; 2013 May [cited 2016 July 19]. Available from: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2011~Main%20Features~Main%20Page~1.
19. UK Department of Health. Guide to creating a front of pack (FoP) nutrition label for pre-packaged products sold through retail outlets. Updated 2016 November [cited 2018 June 02]. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/566251/FoP_Nutrition_labelling_UK_guidance.pdf
20. Sacks G, Tikellis K, Millar L, Swinburn B. Impact of 'traffic-light' nutrition information on online food purchases in Australia. Aust N Z J Public Health. 2011;35(2):122–6.
21. Australia New Zealand Food Standards Code – Standard 1.2.7 – nutrition, health and related claims. Canberra, Australia: Federal Register of Legislation, Australian Government; 2016.
22. National Health and Medical Research Council. Australian Dietary Guidelines. Canberra: Australian Government Department of Health and Ageing; 2013.
23. Munsell CR, Harris JL, Sarda V, Schwartz MB. Parents' beliefs about the healthfulness of sugary drink options: opportunities to address misperceptions. Public Health Nutr. 2016;19(1):46–54.
24. Kim H, House LA. Linking consumer health perceptions to consumption of nonalcoholic beverages. Agric Resour Econ Rev. 2014;43(1):1–16.
25. Bucher T, Siegrist M. Children's and parents' health perception of different soft drinks. Br J Nutr. 2015;113:526–35.
26. Popkin BM, Hawkes C. Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. Lancet Diabetes Endocrinol. 2016;4(2):174–86.

How to cite this article: Brownbill AL, Braunack-Mayer A, Miller C. Health Star Ratings: What's on the labels of Australian beverages?. *Health Promot J Austral.* 2019;30:114–118. https://doi.org/10.1002/hpja.197

Appendix C – Study 2 published manuscript 3

Health Promotion International, 2020, 1–12
doi: 10.1093/heapro/daaa052
Article

Selling function: the advertising of sugar-containing beverages on Australian television

Aimee L Brownbill [1,2,*], Caroline L Miller[1,2], Lisa G Smithers[1,3], and Annette J Braunack-Mayer[1,4]

[1]School of Public Health, The University of Adelaide, SA 5000, Australia, [2]Health Policy Centre, South Australian Health and Medical Research Institute, SA 5000, Australia, [3]Robinson Research Institute, University of Adelaide, SA 5000, Australia and [4]School of Health and Society, University of Wollongong, NSW 2522, Australia

*Corresponding author. E-mail: aimee.brownbill@adelaide.edu.au

Summary

Reducing population consumption of sugar-containing beverages has become a public health priority in many countries due to causal evidence between high consumption, weight gain and non-communicable diseases. This study aims to explore how sugar-containing beverages are associated with health and wellness in television advertisements. Our sample consisted of all televised advertisements from sugar-containing beverage manufacturers aired on free-to-air television from one Australian network (four channels) in 2016 ($n = 30$ unique advertisements). We transcribed advertisements for audio and visual information. We analysed data inductively using methods from thematic, discourse and multi-modal analysis. Advertisements for sugar-containing beverages reflected both traditional (physical health and reduced risk of disease) and broader (wellbeing) conceptualizations of health. Beverages were positioned in advertisements as contributing a functional role to promote and enhance health and wellbeing within the physical, mental and social domains. Beverages were advertised as correcting suboptimal states of being to achieve desirable outcomes, including relaxation, increased resistance to disease, enhanced performance, better cognitive functioning and improved social connections. Positioning beverages within a wider conceptualization of health and wellbeing aligns with how health and nutrition are increasingly being understood and sought out by consumers, creating increased opportunities for the marketing of sugar-containing beverages as 'healthy'.

Key words: advertising, nutrition, discourse, television

INTRODUCTION

Reducing consumption of sugar-containing beverages is widely acknowledged as a public health priority (Woodward-Lopez *et al.*, 2011). Frequent consumption of sugar-containing beverages is associated with weight gain, obesity and adverse health outcomes such as type II diabetes (Hu and Malik, 2010; Imamura *et al.*, 2016), dental caries (Bernabe *et al.*, 2014) and increased risk of cardiovascular disease (Malik *et al.*, 2010). Consumption of sugar-containing beverages is high globally (Popkin and Hawkes, 2016) and governments are increasingly implementing measures to reduce population consumption, e.g. through taxes on sugar-containing beverages (World Obesity, 2018) and social marketing campaigns (Te *et al.*, 2019).

With expanding scientific evidence and the implementation of public health measures to reduce population consumption of sugar-containing beverages, it is unsurprising that consumers have become increasingly concerned about sugar. The UK Food Standards Agency found sugar to be the highest food concern for consumers in the 2018 Public Attitudes Tracker population survey (Food Standards Agency, 2018). In the survey, concern about sugar rose more than any other food-related concern and surpassed price as the top concern in 2018 compared with 2010. Consumer concern about sugar content has also been documented by marketing research companies [e.g. in the USA (Kerry Proprietary Consumer Research, 2018) and Australia (Ipsos, 2016)]. Furthermore, consumer market analysts are linking consumer concerns about sugar, and health and wellness more broadly, to the increased sales of beverages using health and wellness marketing (Euromonitor International, 2019b).

Manufacturers use health and nutrition claims when marketing foods and beverages to influence purchasing and consumption behaviour (Jenkin *et al.*, 2014; Kaur *et al.*, 2017). Many governments regulate the use of health- and nutrition-related claims, which are often defined as explicit claims related to the nutrients present within products and nutrient–health relationships (De Boer and Bast, 2015). However, it is less common for countries to regulate marketing techniques that promote more general concepts of health and wellbeing despite this type of marketing being common for discretionary (non-core) food and beverage products (Mayhew *et al.*, 2016; Brownbill *et al.*, 2018b; Pulker *et al.*, 2018). For example, marketing techniques more implicitly addressing health and wellness may include the positioning of products as being natural, functional and/or generally better-for-you than other products (Euromonitor International, 2019c). Associating discretionary products, such as sugar-containing beverages, with health and wellness can create a 'health halo' for these products, making them appear healthier than they are or would otherwise be perceived (Sundar and Kardes, 2015, Harris *et al.*, 2018, Brownbill *et al.*, 2020).

Previous research has found that it is common for sugar-containing beverages to be associated with health and wellness through claims and images on their labels (Brownbill *et al.*, 2018b). In this study, we seek to explore further how sugar-containing beverages are associated with health and wellness in television advertising. Doing so will provide further insight into the marketing of health and wellness as associated with sugar-containing beverages that goes beyond assessing the presence of health and nutrition claims which are narrower in scope.

MATERIALS

We qualitatively analysed television advertisements to explore in-depth how sugar-containing beverages are marketed in relation to health and wellness. We drew on methods from thematic (Braun and Clarke, 2006; Braun *et al.*, 2019), discourse (Potter and Wetherell, 1987; Ussher and Perz, 2019) and multi-modal analysis (Machin and Mayr, 2012) to examine what was being presented (the message), how it was being presented (the rhetorical or persuasive devices) and why (the purpose this message may serve).

Theoretical and analytical framework

In this article, we took a social constructionist approach. We acknowledge through this approach that the ways in which viewers experience and interpret advertisements are shaped both by the advertisement and by wider social forces. Therefore, we drew on the literature about how broader societal forces are referenced in the advertisements to suggest what messaging and meanings are given preference in the way the advertisements are presented (Potter and Wetherell, 1987; Wetherell *et al.*, 2001; Machin and Mayr, 2012).

In our analysis, we considered both the subject matter and rhetorical devices used within advertisements and the way in which these address or reproduce current ideologies (Lupton, 1992). We used thematic analytical methods to analyse the messages that were presented within advertisements and why these may resonate with viewers. Drawing on discourse analytical methods allowed us to analyse the language and imagery in advertisements to display how meaning is negotiated and constructed (Ussher and Perz, 2019). In particular, it allowed us to analyse the rhetorical or persuasive devices within the advertisements, i.e. how the message was being sold and why it may resonate with viewers. As we were working with television advertisements, we employed a multi-modal method which considers both audio (i.e. speech and other sounds) and visual (i.e. text and images on screen) information as language to analyse the way these features worked in conjunction to communicate and strengthen a message (Machin and Mayr, 2012).

Data sample

Our sample frame included all televised advertisements containing beverages broadcasted between January and

December 2016 on one free-to-air network (one of four major commercial networks) comprising four channels in South Australia. Detailed information regarding data collection and the dataset of food and beverage advertisements broadcasted on this network during this time frame ($n = 778\,475$) are reported elsewhere (Smithers *et al.*, 2018). Illustrated in Figure 1, of the 893 unique food and beverage advertisements broadcast, 50 contained beverages. We excluded advertisements produced by retailers (e.g. supermarkets) and only analysed advertisements that were produced by the manufacturer; therefore, exclusively advertising the beverage product. We also excluded advertisements that contained only non-sugar varieties of beverages. Our final sample consisted of 30 unique sugar-containing beverage advertisements. The advertisements were for the following beverage types: soft drinks, flavoured milk beverages (including milk additions, i.e. Milo), sports drinks, energy drinks and iced tea. No ethical approval was required for this study.

Data analysis

A.L.B imported advertisements into NVivo 11 (QSR International Pty Ltd, 2016) and transcribed the text, oral/audio, and visual information of advertisements. A.L.B. familiarized themselves with the data by repeatedly viewing the advertisements and reading transcripts while making descriptive notes, developing a sense of each advertisement alone and in relation to each other. A.L.B. inductively coded the data and analysed codes for common representations, meanings and values represented across or between beverage advertisements.

The coding and analysis process was iterative and included continued consultation between authors (Braun and Clarke, 2006; Braun *et al.*, 2019). We explored and identified themes at the latent level through contextualizing our observations within the wider literature. This allowed us to develop a sense of the dataset as a whole and consider all aspects of the advertisements before considering which (if any) aspects of the advertisements associated sugar-containing beverages with health and wellness.

RESULTS

We observed health- and wellness-related themes in 25 of the 30 advertisements (energy drink $n = 2$, flavoured milk $n = 7$, iced tea $n = 1$, soft drinks $n = 11$ and sports drink $n = 4$). Below we illustrate and discuss the messaging and persuasive devices present in the advertisements and how they may function to associate sugar-containing beverages with health and wellness. Images of advertisements accompanying excerpts are provided in Supplementary Material. Based on our observations, we have divided our results into two sections: health and wellbeing in advertisements to reflect health- and wellness-related messaging; and persuasive devices across the advertisements which demonstrate how a persuasive argument is constructed to sell this messaging (illustrated in Figure 2). Throughout we discuss the purpose these observations may serve and how they may resonate with viewers.

Health and wellbeing in advertisements for sugar-containing beverages

Advertisements presented sugar-containing beverages as contributors to physical and psychosocial health and wellness. We identified two overarching discourses relating to health and wellness in advertisements: a discourse of protecting health and wellness and a discourse of enhancing human capabilities. We describe these discourses below based on their dominant positioning in advertisements although they were not mutually exclusive in each advertisement.

Protecting health and wellness

Advertisements constructed a discourse of protecting health and wellness through the positioning of beverages as contributing to illness prevention and mental wellbeing. These advertisements encouraged viewers to consume the beverages to help maintain their health and wellbeing.

Preventing illness

Probiotic beverage Yakult was advertised as a preventive measure to protect consumers' health. In the first of two advertisements, the digestive system needed protecting (Excerpt 1), and in the second advertisement, there was a broad reference to 'protecting the future you' alongside a reference to Yakult as 'the healthy family drink'. However, neither advertisement made it clear what the viewers' health, or digestive system, need protecting from. Rather, the advertisements alluded ambiguously to a threat to health. Set within a broader health conscious society, this may stimulate or target pre-existing health anxieties about minor bodily symptoms (Greenhalgh and Wessely, 2004; Crawford, 2006). In Excerpt 1, particularly, the beverage was a type of 'functional food' equating food to medicine (Scrinis, 2008). Overall, the advertisements encourage the viewer to assess their health and take protective measures against illnesses that may (or may not) eventuate.

Fig. 1: Sample selection of televised sugar-containing beverage advertisements broadcasted between January and December 2016 on a major free-to-air network in South Australia.

Excerpt 1. Yakult.

> Woman on screen appears with credentials 'BApplSc, Grad Dip Diet, APD'. She explains: 'This is Doctor Minoru Shirota. More than 80 years ago, he began researching the role of beneficial bacteria in the digestive system. His research led him to discover a unique bacteria that survives the journey through the digestive system. That's why Yakult is the only probiotic drink that contains the Shirota strain. And that's why, every day, somewhere in the world, more than 30 million people drink a bottle of Yakult...'

Protecting mental wellbeing

Real Iced Tea Co. was advertised as a product to help an individual find peace and relaxation in an otherwise busy world. The advertisement showed a woman 'unwinding' in a garden while consuming the beverage (Excerpt 2). The tranquillity of the natural environment was contrasted with the buzz of an urban environment as the camera panned out to show the garden was a small patch located within a city. The advertisement suggests that, by consuming the product, an individual can create their own sense of peace and calmness to detach themselves from a busy world. The notion of actively seeking relaxation has similarly been recommended in popular media discourse as a means of promoting wellbeing through helping busy individuals to unwind and counterbalance the stresses of modern living (Sointu, 2005).

Excerpt 2. Real Iced Tea Co..

> A woman is laying in a garden patch; there are sound of birds chirping and uplifting guitar chords. The camera

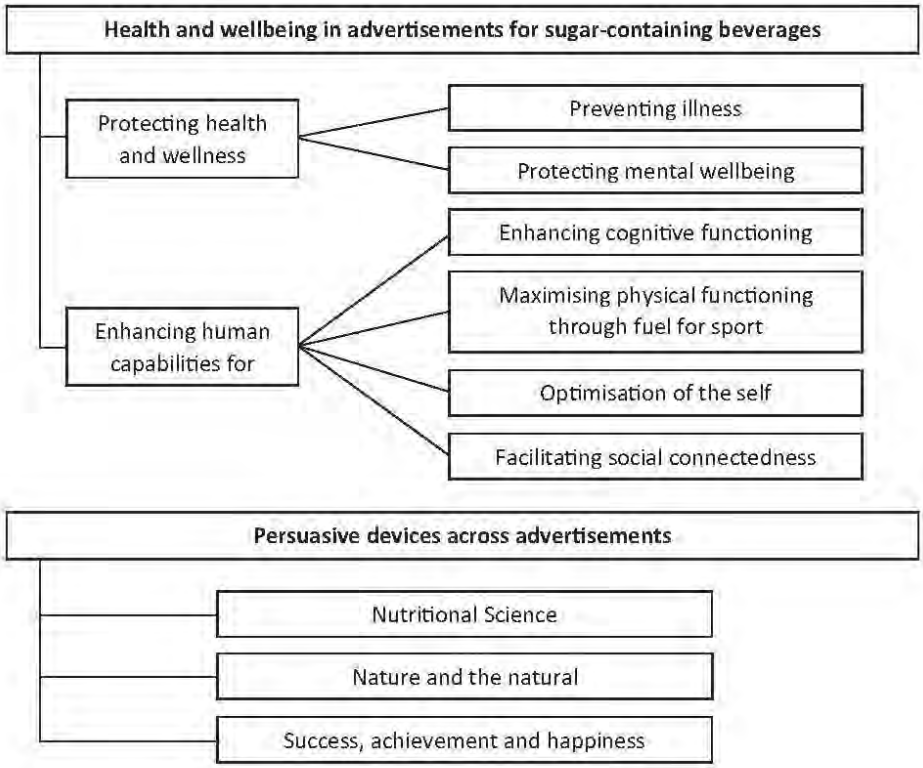


Fig. 2: Thematic map of results.

pans out to reveal the garden patch is located within a city. A woman's gentle voiceover says: 'Unwind with the naturally brewed tea leaves of real iced tea. Brewed to hit the spot'.

Enhancing human capabilities for health and wellness

Advertisements constructed a discourse of enhancing human capabilities for health and wellness through positioning beverages as: enhancing cognitive functioning; maximizing physical functioning through fuel for sport; optimizing the self; and facilitating social connectedness. These advertisements encouraged the viewer to consume the beverages to help develop an enhanced or optimized state of health and wellness.

Enhancing cognitive functioning

Dare Iced Coffee was presented as enhancing the cognitive functioning of consumers. The advertisement in Excerpt 3 portrayed a man struggling to navigate domestic responsibilities (i.e. minding young child, grocery shopping and pet-walking) as he had unknowingly mistaken his pet, shown in his baby carrier, for his child who stands beside him. The advertisement implies that Dare Iced Coffee is the remedy to lapses of concentration when the man is shown in the closing scene carrying his child rather than his pet while drinking the iced coffee. The depiction of a man undertaking domestic responsibilities, which have historically been considered the role of women, may function as a point of reference to changing culture and increasing responsibilities which contribute to the currently busy or '*always on*' culture. In this regard, the advertisement is similar to that for Iced Tea Co. (Excerpt 2) which also addresses the busy individual. However, whereas the iced tea provides a retreat from busy everyday life, the iced coffee is advertised to switch consumers on to function more effectively in everyday life. In this sense, Dare Iced Coffee was associated with enhanced cognitive functioning so that consumers can competently navigate increasing and competing responsibilities in a culture where an individual is always expected to be performing.

Excerpt 3. Dare Iced Coffee.

A man is shown with a dog in a baby carrier while a toddler stands beside him. Male voiceover: 'Uh oh, Dave's got his fur child mixed up with this real child'. The final scene shows Dave drinking a Dare iced coffee, carrying the toddler in the carrier as the voiceover asserts: 'A Dare fix'll fix it'.

Maximizing physical functioning through fuel for sport

Sport drinks were advertised as a source of nourishment to maximize functioning during sport. Advertisements for sports drinks commonly made references to the product as fuel, either through direct or indirect references (e.g. Excerpts 4 and 5). Narratives and imagery both implied the beverage is a source of fuel or nourishment. For example, exhausted athletes being able to continue with their sport after consuming the beverage (e.g. Excerpt 5), or the beverage flowing through to the body's muscles (Except 4). Advertisements also contained salient messaging that associated sweating with a loss of electrolytes. One way this was achieved was through close-up imagery focused on sweat paired with loss-framed messaging (e.g. 'you lose more than just water' in Excerpt 4 and 'electrolytes lost in sweat' in Excerpt 5). This problematizes sweating as creating a deficit and potentially extends this 'problem' to physical activity more broadly. It may also function to defend the place of sport drinks during exercise, as it inherently counters an argument for water as the best beverage option during exercise. In so doing, the advertisements suggested, first, that 'fuel' is required during exercise, and secondly, that there is a right source of fuel, specifically, one containing electrolytes.

Excerpt 4. Gatorade.

> A translucent body is shown drinking Gatorade, the fluorescent liquid is show traveling through to the body's muscles. A male voiceover explains: 'When you sweat, you lose more than just water. Gatorade rehydrates, replenishes and refuels what's lost in sweat; to perform your best'.

Excerpt 5. Powerade.

> A famous rugby player is playing rugby in a stadium. He is tackled roughly to the ground. A close-up shows him on the ground dripping in sweat. He gets up, panting, and he is brought a bottle of Powerade which he guzzles. As he runs, periodic table symbols 'Ca, calcium', 'K, potassium', 'Mg, magnesium', 'Na, sodium' are shown on the ground, lighting up where he treads. Other players are shown falling to the ground as they attempt to tackle him. He then goes on and scores a touchdown. Throughout the advertisement, a male voiceover states: 'New Powerade Ion 4. Formulated with 95% more electrolytes to help replace four of the electrolytes lost in sweat. The science of winning'.

Milo was similarly situated as providing a source of nourishment during children's sport. The two advertisements observed for Milo followed a similar narrative in which early adolescents (boys in one advertisement and girls in the other, Excerpt 6) train relentlessly for their sport. The advertisements overlayed images of Milo with a direct verbal reference to Milo as fuel. The repetitive sequencing within the advertisements presented Milo as part of a ritual in training for sport, implying that it is integral to the children's eventual sporting success. The advertisements also presented the beverage as providing nutrition to children more broadly. This is evident in the sequencing of imagery which included consumption of Milo throughout the day (e.g. at home and school) and the emphasis on early adolescence as a key life stage in which nutrients (in Milo-milk) are needed to support growth and development.

Excerpt 6. Milo.

> The advertisement sequences scenes of a child practising for their sport, in leisure time with teammates, consuming milo [at training, school and home], and missing a goal to correspond with a child's voice over stating: 'My training. My squad. My fuel. My bad [repeated 3 times]'. On the fourth sequence the child scores the goal and instead of 'my bad', an adult voiceover states: 'Milo. Nutrition to help fuel their inner champion'.

Optimization of the self

Sport and energy drinks were positioned as aiding the consumer to optimize themselves. In sport drink advertisements, this related to sporting success as discussed above. The message was constructed through the depiction of the sports drink enhancing sporting performance of athletes who are acknowledged as national sporting champions (Powerade and Gatorade) and global sporting heroes (Gatorade). In the advertisements for V Energy Drink, this message was constructed through the narrative of protagonists who assume they are the best at a certain skill, then shown to be outperformed by a character identical to themselves but consuming the beverage (e.g. Excerpt 7). Although advertisements for sport drinks focused on sporting performance, advertisements for V Energy Drink did not address a specific function or skill. Rather, the advertisements alluded to a general sense of optimizing the self. This may be seen to align with broader societal ideals of individual perfectibility and performance whereby an individual's life in general is in need of enhancement (Clarke *et al.*, 2010). Advertising a general optimizing benefit for consumers does not suggest a specific consumption occasion. This leaves it open to interpretation for consumers to self-identify consumption occasions that best align with their own desire or perceived need for self-optimisation.

Excerpt 7. V Energy Drink.

> A superhero from a well-known franchise appears and proclaims: 'Today we take down apocalypse!' to which he is told he is being replaced. An identical man drinking a can of V Energy Drink appears and the superhero is told that this version is 'just a bit better at saving the world'. The superhero shows off his superpower but is outperformed and embarrassed by his competitor. A can of V Energy Drink is shown in the closing scene and a voiceover boldly exclaims: 'The massive hit, that improves you a bit'.

Facilitating social connectedness

Although other beverage advertisements commonly focused on the narrative of an individual, soft drink advertisements largely focused on a social narrative. Several soft drink advertisements positioned the beverage as facilitating and enhancing social connection and interaction. In the advertisements, social connectedness was illustrated through groups of people enjoying activities together as well as more intimate one-on-one relationships (e.g. Excerpt 8). Although soft drink advertisements have previously been documented as depicting happiness and friendships (Brownbill *et al.*, 2018a), we found that many advertisements for soft drinks went beyond associating the beverage with these values to depict the beverage as playing an active role in facilitating social connectedness. For example, advertisements for Pepsi showed the beverage bridging language barriers to bring together people who otherwise would likely not have connected (e.g. Excerpt 9). Situating the beverage at the centre of social and intimate relationships and as a facilitator to social connection may function to normalize and legitimize the place of soft drinks within everyday social situations.

Excerpt 8. Coca-Cola.

> In upbeat song: 'No-one can stop me when I taste the feeling, nothing can ever bring me down. Taste the feeling'. A sequence of scenes are shown with individuals, pairs, and groups with Coca-Cola featured in scene. Text on screen reads throughout: 'Coca-Cola with bubbles. Bubbles with friends. Friends with stories. Stories with desire. Desire with Coca-Cola. Coca-Cola with music. Music with madness. Madness with you. You with Coca-Cola. Coca-Cola with feeling. Taste the feeling'.

Excerpt 9. Pepsi.

> Four young backpackers are gathered in a train station. A woman is speaking French, unsuccessfully attempting to signal what she is trying to communicate to the group. Another backpacker overhears and understands; he shows the group his Pepsi can with a car icon on it. The five of them are then shown together in the back of a truck, exploring alleyways, attending a party (after being signalled by a stranger holding a Pepsi can with a party horn icon), and finally on board a train where they stand looking at a Pepsi can with an Eiffel Tower icon, smiling and nodding.

Above we have presented health- and wellness-related messaging in sugar-containing beverage advertisements and have briefly discussed some aspects of contemporary culture and values that certain advertised functions of beverages may be working to invoke. Overall, we found that sugar-containing beverages were advertised as a way to correct a suboptimal current state of being to a desired outcome (i.e. healthy digestive system, relaxation, alertness, performance and social connection) which supports health and wellbeing within a broad conceptualization (i.e. physical, mental and social health and wellbeing).

Persuasive devices across advertisements

In this section, we will discuss common themes we identified across the various forms of health and wellness described earlier. Our focus is on why it is that consumers may be particularly responsive to these messages.

Nutritional science

Advertisements for Yakult and sport drinks heavily referenced nutritional science to create persuasive power through the presentation of the beverages as nutritionally functional. The advertisements achieved this using nutritional experts, nutritional concepts and scientific symbolism. The Yakult advertisement uses a dietitian presenter whose academic credentials are shown on screen and the doctor who is credited with making the scientific discovery. In advertisements for sport drinks, scientific expertise was assumed through the nutritional concept of electrolytes as necessary for optimal sporting performance (as previously discussed) and scientific symbolism.

Nature and the natural

Several beverage advertisements associated the beverage with nature and natural ingredients. Advertisements for Schweppes beverages provide one example of this (Excerpt 10). The advertisement shows a woman collecting the ingredients of the beverage in a field of fruit trees and a forest. The advertisement contains strong imagery of nature and the presentation of the woman herself (i.e.

brown hair, absence of noticeable make up and wearing a plain white cotton dress) reinforces the natural imagery. The advertisement for Real Iced Tea Co. (Excerpt 2) and Coca-Cola Life both contain women of similar appearance, laying back relaxing in nature. Certain advertisements also more overtly promote the natural ingredients of beverages. For example, the advertisement for Real Iced Tea Co. (Excerpt 2) states that the beverage is made with 'naturally brewed tea leaves' and shows images of tea leaves and slices of fresh fruit on screen. Similarly, an advertisement for Dare Iced Coffee also states that the beverage is made from 'real coffee beans and rivers of real, fresh, splashy splashy milk' with imagery of milk gushing through a canal of coffee beans. Nature is commonly used in advertising to position products as intrinsically good and healthy products (Hansen, 2002) and advertising natural ingredients is a way in which marketers can align products with popular and expert food discourse which are known to purport healthy eating as consuming 'real', 'natural' and 'whole' foods (Scrinis, 2013).

Excerpt 10. Schweppes.

> A male voiceover states: 'So, you're thinking, 'I want the world's finest tonic water'. Well, you'll need lemons, and oranges. Take a peel, steep it, then wait, and wait some more. Next, find the cinchona tree, you'll need the bark, and... a master blender to blend it perfectly. That leaves one thing left to do...let it out'. Concurrently the advertisement shows a young woman in a field of lemon and orange trees; she picks a lemon from the tree. She is then shown walking through a forest and comes across a tree which is shown with light shining down on it. A close-up of a lemon covered in condensation is shown and the screen then fills with a yellow liquid swirling, it turns clear and bubbles are shown swirling as they turn into the lid of the Schweppes bottle.

Success, achievement and happiness

Advertisements presented beverages as integral to success, achievement and happiness. This was often achieved with competition narratives. Advertisements associated winning with a sense of pride and boost to self-esteem through the depiction of positive body language (e.g. cheerful roar, smiling, arms outstretched victoriously) and social praise (e.g. teammates high-fiving, patting on the back). In contrast, advertisements associated losing with dissatisfaction (e.g. slumped shoulders, closure of eyes and head tilted downward), weakness (e.g. falling to the ground) and even humiliation (e.g. the butt of the joke). Advertisements that did not have a competitive slant depicted generic portrayal of happiness linked with consumption (e.g. smiling or laughing with, or after consuming, the beverage).

DISCUSSION

Given community awareness and concern regarding sugar is increasing, we aimed to explore how sugar-containing beverages are associated with health and wellness in Australian television advertisements. We found that advertisements addressed both a traditional view of health as relating to the physical body and, in some advertisements, as the absence of disease, as well as a broader conceptualization of health extending to broader domains of wellbeing. Beverages were positioned in advertisements to play a functional role to promote and enhance health and wellness within these domains. Although the advertisements do not explicitly assert that the consumption of the advertised beverages directly result in improved health and wellbeing, they do imply that consumption of the advertised beverages contribute to achieving and maintaining health promoting states of being.

Positioning beverages as functional within a wider conceptualization of health aligns with a paradigm shift in how matters of health and nutrition are understood by consumers. Nutritionism has been the dominate ideology relating food to health in western countries since the mid-1900s (Scrinis, 2008). Nutritionism is a reductionist approach which reduces foods to single components, drawing attention from the nutrition profile of the food as a whole (Scrinis, 2013). The nutritionist ideology has been particularly fruitful for marketers who have promoted the health benefits of individual nutrients within foods, regardless of the food's whole nutritional profile (Scrinis, 2013). In recent times, this has seen to the rise in the production and promotion of 'functional foods' which are marketed as enhancing and optimizing health, or particular bodily functions, based on particular nutrients within foods (Scrinis, 2008). We found that televised sugar-containing beverage advertisements mostly implied rather than explicitly promoted nutrient-related health benefits.

Although we found that televised sugar-containing beverage advertisements presented the ideals of a functional product that enhances and optimizes the consumer, the functionality of beverages was not limited to physical health or the role of specific nutrients in achieving functionality. Rather, we found that beverage advertisements often implied the beverages contributed to

functions related to a wider conceptualization of health and general wellbeing. Advertising food and beverages within a wider conceptualization of health has similarly been observed in a study of health discourse in Swedish televised food advertisements (Prell *et al.*, 2011). Researchers have previously suggested that the food paradigm should, and is, changing from a reductionist view of food to a holistic view of food as contributing to wider wellbeing. Within the latter conceptualization, food is consumed for physical, psychological, cultural and social reasons that affect health and wellbeing (Block *et al.*, 2011). This broader conceptualization aligns with how consumers are increasingly understanding, and marketers are increasingly advertising, the role of food in attaining health and wellbeing (Block *et al.*, 2011; Prell *et al.*, 2011; Bisogni *et al.*, 2012).

A holistic conceptualization of health is similarly used in wider health promotion discourse, as is reflected by the World Health Organization's definition of health as 'a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity'. Scrinis suggests that the food industry has appropriated the nutritionism paradigm, through the production and promotion of foods fortified with nutrients, which has led to a dominance of this paradigm in public discourse (Scrinis, 2013). Advertising food and beverages as contributing to a broader conceptualization of health and wellbeing may similarly misappropriate this conceptualization in broader health promotion discourse. When advertisements for unhealthy food and beverages appropriate the concepts and language of health promotion, this weakens health promotion messages.

The increasing popularity of a holistic conceptualization of health and wellbeing has also created increased marketing opportunities for food and beverage manufacturers (Block *et al.*, 2011; Aguilera *et al.*, 2019). We found that associating beverages within a wider conceptualization of health and wellness expands the opportunities for consumers to use these beverages. For example, the advertisements included occasions when a consumer needs to be mentally alert, relaxed and to achieve the most out of exercise and social situations. Simultaneously, the advertisements suggested that if consumers do these things they will be happy, feel accomplished and abide by current scientific knowledge. When the set of advertisements are taken as a whole, several consumption occasions throughout the day are promoted. The focus on consumption occasions that address broad health and wellbeing needs have similarly been reported in market research by Euromonitor as contributing to increasing every day and throughout the day beverage consumption (Euromonitor International, 2019a). Advertising beverages in this way reframes frequent consumption of sugar-containing beverages as contributing to health and wellbeing and diverts attention from the negative health implications of frequent consumption of these beverages.

Regulation of marketing claims relating to nutrient content and nutrient–health relationships is limited in its capacity to address much of the health-related marketing messaging we observed in sugar-containing beverage television advertisements; i.e. implicit messaging and that pertaining to an indirect effect of consumption on health and wellbeing. Given implicit health-related marketing can have a health halo effect (Sundar and Kardes, 2015; Harris *et al.*, 2018; Brownbill *et al.*, 2020), more stringent regulation of the marketing practices of sugar-containing beverage manufacturers is needed. One approach is to expand existing regulation, e.g. the Australian New Zealand Food Standards Code on Nutrition, Health and Related Claims in Australia (Food Standards Australia New Zealand, 2016), to restrict a wider array of health-related content in marketing. However, creating and enforcing content restrictions that address the use of a broad conceptualization of health and wellbeing in marketing will likely prove difficult, particularly when the benefits to health and wellbeing are implied through an indirect association, and if implemented as a sole regulatory measure. Another approach is to implement a ban on the marketing of sugar-containing beverages, as is now identified an effective measure in reducing sugar-containing beverage consumption (Taillie *et al.*, 2020). The Chilean Food Labelling and Advertising law, introduced in 2016, currently provides one of the most comprehensive examples of food and beverage marketing regulation globally (Bergallo *et al.*, 2018; Taillie *et al.*, 2019, 2020). The Chilean law prohibits the advertising of food and beverages high in energy, sugars, saturated fats and/or sodium on television during the hours of 6 am–10 pm and further imposes child-specific content restrictions on the advertising of these products outside of these hours (Taillie *et al.*, 2019). The Chilean law does not specifically regulate health-related marketing, with the exception of claims directly related to nutrients of concern (i.e. sugar, saturated fat and sodium), which has previously been raised as a limitation of the regulation by others (Corvalán *et al.*, 2019; Taillie *et al.*, 2019). To help address the misleading marketing of sugar-containing beverages as healthy, or better for consumers than in actuality, other countries such as Australia could look to implement regulation similar to the

Chilean Food Labelling and Advertising law, which could be further enhanced by the inclusion of health-related content restrictions.

LIMITATIONS AND FUTURE RESEARCH

In this analysis, there are aspects that might be further elaborated, such as the active role advertisements play in both reflecting and constructing public values and ideologies. For example, we have touched upon elements in the advertisements that allude to a personal responsibility for health and how the beverage is presented to encourage consumers to assume this responsibility. A wider discussion could be had about how such advertising may undermine public health efforts at an ideological level. Additional messaging and persuasive devices also exist within the wider sample of beverage advertisements that were not directly related to the discussion of health and wellness. It is also important to examine how else beverages are being advertised and additional messaging that is currently used to sell these products as they can also influence consumer perceptions and consumption of sugar-containing beverages.

The limitations of the initial collection of the advertisement dataset have been noted elsewhere (Smithers *et al.*, 2018). The sample of beverage advertisements used in this study is limited to the brands and beverage types advertised on the network as captured by the data collection tool and the results cannot be generalized to all sugar-containing beverages, as is the case with most qualitative research. Although the sample reflects some well-known brands amongst beverage categories, other popular brands are absent. In addition, beverage categories such as juice and coconut water which are promoted as healthy or better-for-you were also not present in this data set (Brownbill *et al.*, 2018b). The reason for this absence is unclear. Analysing multimedia advertisements for such beverages may provide more in-depth insight into how these beverages are associated with health and wellness in advertising.

Advertising is dynamic: it changes to reflect and address changing consumer values and demands while also generating consumer demand. Our data are therefore reflective of the advertising of sugar-containing beverages at the point in time it was aired. However, healthy living remains an influential driver of global consumption (Euromonitor International, 2019a). It is therefore likely that the messages identified in this research will continue and potentially increase in predominance.

CONCLUSION

Sugar-containing beverages are positioned as contributing a functional role within a broad conceptualization of health and wellness that aligns with how consumers are increasingly understanding health and nutrition. Positioning beverages in this way promotes a range of consumption occasions and deflects attention from the negative health consequences associated with frequent consumption of sugar-containing beverages. Situating beverages within this wider conceptualization also aligns with a wider health discourse; those working in health promotion should be cognizant that the language used to promote health and to advertise sugar-containing beverages can overlap.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Health Promotion International* online.

ACKNOWLEDGEMENTS

We would like to acknowledge Professor John Lynch and Dr Matthew Sorell who worked on the original grant which funded the development of the system that captured the advertisements used in this research, and Dr Matthew Sorell and Dr Benjamin Agnew who developed the system.

FUNDING

This work was supported by an Australian Government Research Training Program Stipend Scholarship (A.L.B.) and an Ian Wilson Liberal Research Scholarship (A.L.B.). The data used in this study was collected through a project funded by a Vanguard grant from the National Heart Foundation of Australia (grant number 100569 to L.G.S.).

CONFLICT OF INTEREST

None.

AUTHORS' CONTRIBUTIONS

A.L.B. coded and analysed the data, with scientific input from C.L.M. and A.J.BM. A.L.B. drafted the article. L.G.S. provided the data. All authors contributed to the conceptualization and design of the study and reviewed and revised the final version of the article.

ETHICAL STANDARDS DISCLOSURE

This research project was exempt from review by a Human Research Ethics Committee as no human data was used and the research did not pose any foreseeable risk of harm or discomfort.

REFERENCES

Aguilera, J. M., Kim, B. K. and Park, D. J. (2019) Particular alimentations for nutrition, health and pleasure. *Advances in Food and Nutrition Research*, 87, 371–408.

Bergallo, P., Castagnari, V., Fernandez, A. and Mejia, R. (2018) Regulatory initiatives to reduce sugar-sweetened beverages (SSBs) in Latin America. *PLoS One*, 13, e0205694.

Bernabe, E., Vehkalahti, M. M., Sheiham, A., Aromaa, A. and Suominen, A. L. (2014) Sugar-sweetened beverages and dental caries in adults: a 4-year prospective study. *Journal of Dentistry*, 42, 952–958.

Bisogni, C. A., Jastran, M., Seligson, M. and Thompson, A. (2012) How people interpret healthy eating: contributions of qualitative research. *Journal of Nutrition Education and Behavior*, 44, 282–301.

Block, L. G., Grier, S. A., Childers, T. L., Davis, B., Ebert, J. J., Kumanyika, S. *et al.* (2011) From nutrients to nurturance: a conceptual introduction to food well-being. *Journal of Public Policy & Marketing*, 30, 5–13.

Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101.

Braun, V., Clarke, V., Hayfield, N. and Terry, G. (2019) Thematic analysis. In Liamputtong, P. (ed.), *Handbook of Research Methods in Health Social Sciences*. Springer, Singapore. pp. 843–860.

Brownbill, A. L., Miller, C. L. and Braunack-Mayer, A. J. (2018a) The marketing of sugar-sweetened beverages to young people on Facebook. *Australian and New Zealand Journal of Public Health*, 42, 354–360.

Brownbill, A. L., Miller, C. L. and Braunack-Mayer, A. J. (2018b) Industry use of 'better-for-you' features on labels of sugar-containing beverages. *Public Health Nutrition*, 21, 3335–3343.

Brownbill, A. L., Braunack-Mayer, A. J. and Miller, C. L. (2020) What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness. *Appetite*, 150, 104675.

Clarke, A., Mamo, L., Fishman, J., Shim, J. and Fosket, J. B. (2010) A theoretical and substantative introduction. In Riska, E. (ed), *Biomedicalization: Technoscience, Health, and Illness in the U.S.* Duke University Press, Durham. pp. 1–44.

Corvalán, C., Reyes, M., Garmendia, M. L. and Uauy, R. (2019) Structural responses to the obesity and non-communicable diseases epidemic: update on the Chilean law of food labelling and advertising. *Obesity Reviews*, 20, 367–374.

Crawford, R. (2006) Health as a meaningful social practice. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*, 10, 401–420.

De Boer, A. and Bast, A. (2015) International legislation on nutrition and health claims. *Food Policy*, 55, 61–70.

Euromonitor International. (2019a) *Soft Drinks Global Industry Overview*. Euromonitor International, London.

Euromonitor International. (2019b) Soft Drinks in Australia. Euromonitor International, Sydney.

Euromonitor International. (2019c) Health and Wellness in Australia. Euromonitor International, Sydney.

Food Standards Agency. (2018). Public Attitudes Tracker Survey. https://www.food.gov.uk/news-alerts/news/public-attitudes-tracker-survey-results-published-0 (last accessed 22 April 2020).

Food Standards Australia New Zealand. (2016) Australia New Zealand Food Standards Code—Standard 1.2.7—Nutrition, Health and Related Claims. Federal Register of Legislation, Australian Government, Canberra, Australia.

Greenhalgh, T. and Wessely, S. (2004) 'Health for me': a sociocultural analysis of healthism in the middle classes. *British Medical Bulletin*, 69, 197–213.

Hansen, A. (2002) Discourses of nature in advertising. *Communications*, 27, 499–511.

Harris, J. L., Haraghey, K. S., Lodolce, M. and Semenza, N. L. (2018) Teaching children about good health? Halo effects in child-directed advertisements for unhealthy food. *Pediatric Obesity*, 13, 256–264.

Hu, F. B. and Malik, V. S. (2010) Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence. *Physiology & Behavior*, 100, 47–54.

Imamura, F., O'Connor, L., Ye, Z., Mursu, J., Hayashino, Y., Bhupathiraju, S. N. *et al.* (2016) Consumption of sugar sweetened beverages, artificially sweetened beverages, and fruit juice and incidence of type 2 diabetes: systematic review, meta-analysis, and estimation of population attributable fraction. *British Journal of Sports Medicine*, 50, 496–504.

Ipsos. (2016). Australia's most comprehensive study integrating consumer attitudinal trends with consumption behaviour change. Annual Report 2015–16. http://ipsos.com.au/wp-content/uploads/2016/05/Food-CHATs-report-abridged.2016.pdf (last accessed 22 April 2020).

Jenkin, G., Madhvani, N., Signal, L. and Bowers, S. (2014) A systematic review of persuasive marketing techniques to promote food to children on television. *Obesity Reviews*, 15, 281–293.

Kaur, A., Scarborough, P. and Rayner, M. (2017) A systematic review, and meta-analyses, of the impact of health-related claims on dietary choices. *International Journal of Behavioral Nutrition and Physical Activity*, 14, 93–110.

Kerry Proprietary Consumer Research. (2018) *Sensibly Sweet, Formulating for Clean Label Taste*. https://kerry.com/na-e-n/explore/sensibly-sweet-white-paper (last accessed 22 April 2020).

Lupton, D. (2010) Discourse analysis: a new methodology for understanding the ideologies of health and illness. *Australian Journal of Public Health*, 16, 145–150.

Machin, D. and Mayr, A. (eds) (2012) How to do critical discourse analysis. *A Multimodal Introduction*. Sage Publications, Los Angeles.

Malik, V. S., Popkin, B. M., Bray, G. A., Després, J.-P.,. and Hu, F. B. (2010) Sugar-sweetened beverages, obesity, type 2

diabetes mellitus, and cardiovascular disease risk. *Circulation*, 121, 1356–1364.

Mayhew, A. J., Lock, K., Kelishadi, R., Swaminathan, S., Marcilio, C. S., Iqbal, R. *et al.* (2016) Nutrition labelling, marketing techniques, nutrition claims and health claims on chip and biscuit packages from sixteen countries. *Public Health Nutrition*, 19, 998–1007.

Popkin, B. M. and Hawkes, C. (2016) Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. *The Lancet. Diabetes & Endocrinology*, 4, 174–186.

Potter, J. and Wetherell, M. (eds) (1987) *Discourse and Social Psychology: Beyond Attitudes and Behaviour*. Sage Publications, London.

Prell, H., Palmblad, E., Lissner, L. and Berg, C. M. (2011) Health discourse in Swedish television food advertising during children's peak viewing times. *Appetite*, 56, 607–616.

Pulker, C. E., Scott, J. A. and Pollard, C. M. (2018) Ultra-processed family foods in Australia: nutrition claims, health claims and marketing techniques. *Public Health Nutrition*, 21, 38–48.

QSR International Pty Ltd. (2016) NVivo Qualitative Data Analysis Software. Version 11. https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software (last accessed 22 April 2020).

Scrinis, G. (2008) On the ideology of nutritionism. *Gastronomica*, 8, 39–48.

Scrinis, G. (eds) (2013) *Nutritionism. The Science and Politics of Dietary Advice*. Columbia University Press, New York.

Smithers, L. G., Haag, D. G., Agnew, B., Lynch, J. and Sorell, M. (2018) Food advertising on Australian television: frequency, duration and monthly pattern of advertising from a commercial network (four channels) for the entire 2016. *Journal of Paediatrics and Child Health*, 54, 962–967.

Sointu, E. (2005) The rise of an ideal: tracing changing discourses of wellbeing. *The Sociological Review*, 53, 255–274.

Sundar, A. and Kardes, F. R. (2015) The role of perceived variability and the health halo effect in nutritional inference and consumption. *Psychology & Marketing*, 32, 512–521.

Taillie, L. S., Busey, E., Stoltze, F. M. and Dillman Carpentier, F. R. (2019) Governmental policies to reduce unhealthy food marketing to children. *Nutrition Reviews*, 77, 787–816.

Taillie, L. S., Reyes, M., Colchero, M. A., Popkin, B. and Corvalán, C. (2020) An evaluation of Chile's Law of Food Labeling and Advertising on sugar-sweetened beverage purchases from 2015 to 2017: a before-and-after study. *PLoS Medicine*, 17, e1003015.

Te, V., Ford, P. and Schubert, L. (2019) Exploring social media campaigns against sugar-sweetened beverage consumption: a systematic search. *Cogent Medicine*, 6, e1607432.10.1080/2331205X.2019.1607432.

Ussher, J. M. and Perz, J. (2019) Critical discourse/discourse analysis. In Liamputtong, P. (ed.), *Handbook of Research Methods in Health Social Sciences*. Springer, Singapore. pp. 881–896.

Wetherell, M., Taylor, S. and Yates, S. (eds) (2001) *Discourse as Data: A Guide for Analysis*. Sage Publications, London.

Woodward-Lopez, G., Kao, J. and Ritchie, L. (2011) To what extent have sweetened beverages contributed to the obesity epidemic?. *Public Health Nutrition*, 14, 499–509.

World Obesity. (2018). World Obesity *Resources*. https://www.worldobesity.org/resources (last accessed 22 April 2020).

Appendix D – Study 3 published manuscript 4

Appetite 150 (2020) 104675

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness

Aimee L. Brownbill[a,b,*], Annette J. Braunack-Mayer[c], Caroline L. Miller[a,b]

[a] The University of Adelaide, School of Public Health, Level 9, Adelaide Health and Medical Sciences Building, The University of Adelaide, South Australia, 5000, Australia
[b] South Australian Health and Medical Research Institute, Health Policy Centre, Level 8, SAHMRI North Terrace, South Australia, 5000, Australia
[c] University of Wollongong, School of Health and Society, School of Health and Society, Building 15.143, University of Wollongong, New South Wales, 2522, Australia

ARTICLE INFO

Keywords:
Consumer attitudes
Consumption
Perception
Qualitative
Sugar-sweetened beverages
Young adults

ABSTRACT

Sugar-containing beverages are the leading source of added sugar consumption among young adults. The aim of this study was to explore how young adults conceptualise what influences the healthfulness of sugar-containing beverages.

Seven focus groups stratified by gender and educational institute were conducted with South Australians aged 18–25 years (n = 32). Focus groups were semi-structured and included a ranking activity where participants individually ranked eight beverages from least to most healthy. Focus groups were recorded, transcribed verbatim and thematically analysed.

Participants commonly selected soda (soft drink) and energy drink as the least healthy beverage and water as the healthiest, but those between varied in rankings. Four themes were identified relating to how participants conceptualise beverage healthfulness in the thematic analysis: ingredients harmful to health, properties beneficial to health, functionality, and packaging. While participants were aware that beverages can contain high amounts of sugar, and that this can be harmful to health, many other factors influence the perceptions of beverage healthfulness and these can outweigh the perceived harms of consumption.

Public health interventions and policies are needed to address misperceptions about the healthfulness of sugar-containing beverages to better put the harms of high sugar consumption in perspective for consumers.

1. Introduction

Over half of young Australian adults exceed the World Health Organization (WHO) recommendations to limit free sugar consumption (Gupta, Smithers, Braunack-Mayer, & Harford, 2018). Free sugar is defined by the WHO as "monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates" (World Health Organization, 2015). Sugar-containing beverages are the leading source of free sugar consumption among young adults (Gupta et al., 2018). Regular consumption of sugar-containing beverages is associated with increased weight gain and obesity (Malik, Pan, Willett, & Hu, 2013), metabolic syndrome and type II diabetes (Imamura et al., 2016; Malik et al., 2010), development of dental caries (Bernabe, Vehkalahti, Sheiham, Aromaa, & Suominen, 2014), and risk of cardiovascular disease (Malik, 2017). Reducing population consumption of sugar-containing beverages has been identified as one way to help address the impact of overweight and related non-communicable disease on populations (Popkin & Hawkes, 2016).

Sugar-containing beverages are marketed ubiquitously through both traditional and new media platforms, in overt and subtle ways, and in environments popular with young people (Brownbill, Miller, & Braunack-Mayer, 2018b; Eisenberg, Larson, Gollust, & Neumark-Sztainer, 2017; Holmberg, Berg, Dahlgren, Lissner, & Chaplin, 2018; Holmberg, E. Chaplin, Hillman, & Berg, 2016). Previous research has found frequent exposure to sugar-containing beverage marketing enhances attitudes towards marketed sugar-containing beverages (Buchanan, Kelly, & Yeatman, 2017) and increases beverage selection (Battram, Piche, Beynon, Kurtz, & He, 2016) and consumption (Hennessy, Bleakley, Piotrowski, Mallya, & Jordan, 2015; Powell, Wada, Khan, & Emery, 2017). A recent trend in the marketing of sugar-containing beverages is the positioning of beverages as healthy or better-for-you. For example, we previously found better-for-you claims were present on 96.8% of sugar-containing beverage labels in Australia,

* Corresponding author. School of Public Health, Adelaide Health and Medical Sciences Building, Level 9, The University of Adelaide, South Australia, 5005, Australia.
E-mail addresses: aimee.brownbill@adelaide.edu.au (A.L. Brownbill), abmayer@uow.edu.au (A.J. Braunack-Mayer), caroline.miller@sahmri.com (C.L. Miller).

https://doi.org/10.1016/j.appet.2020.104675
Received 17 October 2019; Received in revised form 9 March 2020; Accepted 11 March 2020
Available online 14 March 2020
0195-6663/

with these claims commonly positioning the product as natural, emphasising fruit and nutrient content, associating consumption with general wellbeing, and suggesting the beverage has functional properties for maximising sporting performance (Brownbill, Miller, & Braunack-Mayer, 2018a). Other research has found similar marketing trends are also common on sugar-containing beverage labels in other countries (Dachner, Mendelson, Sacco, & Tarasuk, 2015; Perry, Chacon, & Barnoya, 2018; Mediano Stoltze et al., 2018). In an online study with U.S parents, Munsell, Harris, Sarda, and Schwartz (2016) found that at least a third of participants indicated that health related claims (low-calorie, real/natural, vitamin C, antioxidants, low-sodium) were important to their decision to purchase sugar-containing beverages for their children. While little research has specifically explored the influence of health-related marketing on consumption of sugar-containing beverages, there is strong evidence showing health-related marketing practices, such as the use of health and nutrition claims, influence the purchasing and consumption of food more generally (Kaur, Scarborough, & Rayner, 2017; Steinhauser & Hamm, 2018). Therefore, exploring consumer perceptions of the healthfulness of beverages is one way to provide insight into the likely effect of health-related marketing of sugar-containing beverages on consumer purchasing and consumption.

Existing research indicates that consumers hold erroneous views about the healthfulness of certain sugar-containing beverages. For example, previous research has indicated that beverages such as juice, flavoured waters, sports drinks (e.g. Gatorade) and iced teas, are perceived to be healthy, or healthier, and as less likely to lead to disease development, compared to soda (or 'soft drink' e.g. Coca-Cola; Sprite) or energy drinks (e.g. Red Bull) (Eli, Hornell, Elminan Malek, & Nowicka, 2017; Hess, Lilo, Cruz, & Davis, 2019; Moran & Roberto, 2018; Munsell et al., 2016). While some research has shown that consumers' perceived healthfulness of sugar-containing beverages influences consumption of these beverages (Hennessy et al., 2015; Kim & House, 2014), much research to date has focused on sugar content and health-related consequences, indicating that there is general awareness among consumers that sugar-containing beverages can be high in sugar and frequent consumption can lead to weight gain and long-term health consequences (Hattersley, Irwin, King, & Allman-Farinelli, 2009; Hess et al., 2019; Miller, Braunack-Mayer et al., 2019). Little research exists exploring what factors beyond sugar content and adverse health consequences contribute to consumers' overall conceptualisation of beverage healthfulness. An experimental sorting study among Swiss parents and their children by Bucher and Siegrist (2015) provides some insight into the topic. The authors found that parent and child participants commonly used sugar content and presence of additives, caffeine and fruit when sorting beverages by healthfulness and these factors predicted perceptions of beverage healthfulness (Bucher & Siegrist, 2015). Although the study noted several other factors mentioned by parents and children as influencing their sorting of beverages by healthfulness (e.g. naturalness and presence of vitamins) it did not provide an analysis of the influence of these factors on the perceptions of beverage healthfulness, or consider how all factors interact in the overall conceptualisation of beverage healthfulness. Given marketing research has suggested that better-for-you marketing is currently used in attempt to address increasing consumer concerns of the sugar content in beverages and has forecasted that this marketing trend is likely to continue and increase (Euromonitor International, 2016), further consideration should be given to how consumers' concerns about the sugar content and adverse health consequences of frequent consumption are more broadly assessed in the overall conceptualisation of beverage healthfulness.

This study builds on previous research to gain a better understanding of how the health-related marketing of sugar-containing beverages may influence consumers' perceptions of these beverages. To do this, the study aims to develop an understanding of how young adults conceptualise beverage healthfulness through exploring what characteristics and properties of beverages are perceived as healthy or unhealthy and how these perceptions are processed and reasoned to form an assessment of whether a beverage is healthy, healthier, or not healthy. We focused on young adults as they are among the highest consumers of sugar-containing beverages (Gupta et al., 2018; Lindeen, Park, Fan, & Blanck, 2018) and are a prime target for food and beverage marketing (Freeman, Kelly, Vandevijvere, & Baur, 2015). Further, to our knowledge, no research has specifically explored the perceptions of beverage healthfulness among young adults and how health-related marketing may influence their perceptions. Our specific research question for the present study was "How do Australian young adults conceptualise what makes a beverage healthy, or healthier?"

2. Materials and methods

We used a critical realist theoretical approach to examine how young adults conceptualise what makes a beverage healthy, or healthier. Through this approach, we focus on both individuals' views of what influences beverage healthfulness and the ways that the broader social (i.e. through group discussion) and environmental (i.e. through marketing) context might influence those views (Braun & Clarke, 2006; Fletcher, 2017). We chose semi-structured focus groups for data collection and incorporated an individual exercise to assess individual participant views of beverage healthfulness prior to group discussion on the topic. This allowed us to explore both individual views on the topic and to also encourage complementary interaction and debate between participants, prompting participants to explore and clarify their views on what makes a beverage healthy or healthier with each other. The interactive nature of focus groups was therefore particularly useful for obtaining a deeper understanding of how participants collectively conceptualised beverage healthfulness, and how this may be shaped by health-related marketing.

2.1. Participants

As our research question was concerned with young adults, we employed purposive sampling (Liamputtong, 2013) and recruited via educational institutions. We selected one university and one technical and further education (TAFE; i.e. vocational education and training) institute in South Australia to assist in recruiting from different educational backgrounds. We recruited participants via flyers displayed around campus and in student directed emails which advertised participants were needed for group discussions regarding what young adults think about different non-alcoholic drinks and why they drink them. A participant information sheet was sent to interested individuals who were then screened for eligibility to participate. The inclusion criteria required participants to be aged between 18 and 25 years (inclusive), currently studying at the selected institution and fluent in English for the purpose of participating in the group discussion. We provided participants with an AUD $20 gift card to compensate and thank them for their time and contribution.

2.2. Focus groups

We stratified focus groups by gender (male or female) and current educational institution (university or TAFE). The groups were constructed this way to obtain diversity of views, to reduce social bias and to help participants feel comfortable in sharing their views. In total, we facilitated seven focus groups ($n = 32$ participants; 17 female and 15 male) with two groups planned per stratified gender/educational institution (i.e. male university students, male TAFE students, female university students and female TAFE students). Due to participant cancellations the planned eighth group (male TAFE students) did not proceed. The age of participants ranged from 18 to 25 years (with each age represented) with a mean age of 20.3 years. The number of participants in the focus groups ranged between two and seven with a mean

of 4.6 participants per focus group. Focus groups were held in October 2018 and March 2019 and were facilitated by AB. Each group was scheduled for a duration of 60 min and ran for an average of 51.1 min (ranging from 39 to 65 min).

The focus groups were semi-structured and a hierarchical sequence of questions was used to ease participants into discussion and to capture any unprompted discussion related to how participants conceptualised beverage healthfulness (Horowitz et al., 2003). Each group discussion began with a general question about what participants normally drink and why, to introduce participants to the discussion topic and to collect information about consumption behaviours. Eight packaged beverages were then placed in the centre of the table as prompts and participants were asked to discuss whether they were familiar with the beverages and whether the beverages presented were indicative of what they would usually drink. The beverages comprised one beverage from each of the following categories: soda (soft drink), energy drink, 100% juice, sports drink, iced tea, coconut water, kombucha and water (shown in supplementary material as beverage set one). The beverages were purposively selected to represent different types of ready-to-drink (i.e. ≤600 ml) sugar-containing beverages (and one water for comparative purposes) commonly sold in Australian supermarkets (Brownbill et al., 2018a). The selected beverages comprised what may be classified as more traditional sugar-containing beverages, such as soda (e.g. Coca-Cola), as well as more contemporary beverages, such as coconut water, iced tea and kombucha which are heavily marketed as healthy or better-for-you via their labels (Brownbill et al., 2018a). The same eight beverages were used for each focus group. The participants were then asked to individually rank the eight beverages on a piece of paper from the least healthy (1) to the most healthy (8). After doing so, they were asked to discuss collectively how they went about ranking the beverages. The purpose of this ranking activity was to help facilitate discussion regarding participant views of beverage healthfulness and participants were asked to individually rank the beverages on their own before discussion was opened up to the group in order to reduce consensus by social desirability and prompt discussion of dissimilar views where they arose. The facilitator then handed around additional examples of ready-to-drink sugar-containing beverages that were new to the market and participants were asked to discuss their initial thoughts on these products and then how they would rank these beverages amongst those previously discussed and why. The novel beverages comprised the following: V Pure (energy drink), Red Bull Organics Lemonade (soda), Red Bull Organics Cola (soda), Emma & Tom's Iced Green Tea (iced tea), Pump+ (flavoured water; shown in supplementary material as beverage set two). The beverages were selected as examples that participants were likely to be less familiar or unfamiliar with and that also displayed commonly used health-related marketing on their labels, for example claims such as 'natural', 'certified organic', 'no added sugar', 'antioxidants', and 'a natural source of electrolytes' (Brownbill et al., 2018a). This aimed to explore how participants assessed beverage healthfulness when presented with an unfamiliar beverage (and therefore less likely to be influenced by pre-existing views) that is marketed as healthy via their labels and how this assessment is made relative to similar beverages containing less healthy marketing on their labels. Although five beverages were selected, the beverages were randomly rotated between focus groups, with groups being shown two or three of the novel beverages depending on the remaining time allocated for group discussion.

2.3. Data analysis

Focus groups were audio and video recorded, transcribed verbatim (pseudonyms were provided to anonymise participant responses) and input into NVivo 11 for analysis (QSR International Pty Ltd, 2016). AB familiarised themselves with the data by reading and re-reading transcripts, developing a sense of each focus group transcript alone and in relation to each other. AB then coded transcripts and thematically analysed the data at the sematic level (Braun & Clarke, 2006; Braun, Clarke, Hayfield, & Terry, 2019). Although the study was exploratory and coding was mostly inductive, deductive coding based on a simple framework derived from the topic guide was used during the initial round of coding to allow for the comparison of prompted vs unprompted views of what influences beverage healthfulness. To ensure systematic and comprehensive coding, a line-by-line approach was used with all aspects of the data initially coded as important. Codes were analysed for common representations, meanings and values represented within or across focus groups, with the aim to provide a coherent and compelling interpretation of shared patterns of meaning across the dataset, grounded in the data (Braun & Clarke, 2006; Braun et al., 2019). Given no substantial differences were observed between stratified focus groups, later stages of the analysis focused across the groups. Codes were grouped into potential themes and during this phase of analysis, attention was particularly paid to how codes and potential themes related to participants' conceptualisation of beverage healthfulness. Similarities, differences and connections between potential themes and sub-themes were considered with the aid of thematic mapping, with the final themes comprising several sub-themes which were constructed at the semantic level (Braun et al., 2019). The final themes were developed based on their importance to addressing the research topic rather than their prevalence within the data, as is appropriate for a qualitative approach (Braun et al., 2019), and were named to reflect their relevance to the research question. The coding and analysis process was iterative and continued consultation among authors occurred throughout the analysis process.

2.4. Ethical standards disclosure

We obtained ethics approval from The University of Adelaide Human Research Ethics Committee (approval number H-2018-057). All participants involved in this research gave written informed consent before participating and consent was confirmed verbally before recording devices were turned on during focus groups.

3. Results

There was a wide range of beverages reportedly consumed, with participants across all groups reporting that they consumed common beverages including: cordial; coconut waters; energy drinks; iced teas; juices/fruit drinks; sodas (soft drinks); sports drinks; smoothies, milks and waters. In the individual beverage ranking activity, most participants identified the water as the healthiest beverage (ranked '8', n = 29), followed by coconut water (ranked '7', n = 21) as the second healthiest beverage. The coconut water, kombucha, 100% juice and/or iced tea were ranked as healthier than the water by the three participants that did not rank the plain water as the healthiest beverage. Either the energy drink (n = 18) or the soda (n = 12) were most consistently ranked as the least healthy (ranked '1').

Four themes and ten sub-themes were identified relating to how participants conceptualise beverage healthfulness in our thematic analysis as illustrated in Fig. 1. While the stratification of focus groups by gender and educational institution allowed for comparison between these groups, no substantial differences of how beverage healthfulness was conceptualised were observed between groups.

3.1. Ingredients harmful to health

3.1.1. Sugar

Participants suggested that their primary assessment of healthfulness of a beverage was through considering the sugar content. It was uncommon for participants to look at the nutrition information panel on beverages when making this assessment during focus groups. Rather, participants suggested that they either were aware of the relative sugar content of beverages through previous communications on the topic or

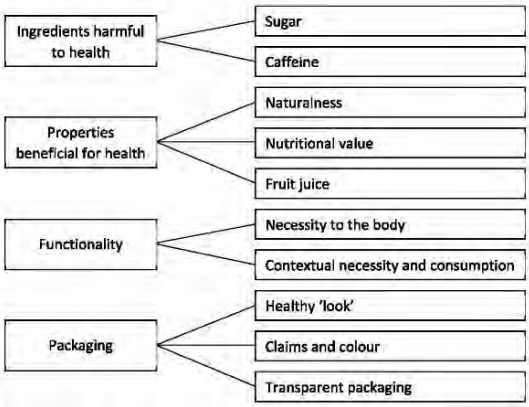


Fig. 1. Thematic map of four themes and 10 sub-themes.

they guessed the sugar content based on their perceptions of relative sugar content between beverages.

"I just thought about sugar mainly, like which had, what had the most sugar in it." Alexis, F, 18, TAFE, FG 7

"Well I went to the dentist and they had the chart, they like show you which drink has more sugar in it, so I guess I kind of judged it by memory of that." Megan, F, 18, Uni, FG 1

"I kind of just took a guess, like an estimated guess, based on where everything else fits." Ryan, M, 19, Uni, FG 3

Participants displayed low levels of knowledge of the actual sugar content in beverages, despite suggesting this is how they primarily assessed beverage healthfulness. Additionally, although participants had a general understanding that high consumption of sugar and sugar-containing beverages can be harmful to health, participants lacked specific knowledge regarding the amount of sugar or sugar-containing beverages that would be considered harmful to health. Participants who did refer to an amount of sugar were confused about recommendations. The difference between assessing sugar content per 100 ml compared to per serve or package appeared to cause most confusion and led to overestimates of acceptable sugar amount in beverages.

"I went to a seminar and they sort of showed us a trick that if you just look at the per 100ml and how much sugar it has, it shouldn't have more than 40 g in the 100ml." Samantha, F, 20, Uni, FG 1

"I chose that one coz it had like a low sugar content per 100ml but then I looked at per serving and it got higher so now I'm confused." Chris, M, 20, Uni, FG 4

It was common for participants to make general statements that less sugar is better, or to discuss general energy balance than to refer to an amount of sugar in beverages that they considered harmful to health.

"So, generally less sugar means it's generally better for you" Ryan, M, 19, Uni, FG 3

"I think as long as you're like using the sugar that you're taking in then it doesn't matter how much you have." Renee, F, 24, Uni, FG 2

3.1.2. Caffeine

High caffeine content was also commonly discussed by participants as contributing to making a beverage unhealthy. Energy drinks, in particular, were viewed as unhealthy for their high caffeine content and this was seen by several participants as an added negative that made energy drinks unhealthier than sodas.

"I suppose with V [energy drink] you've got a slight addiction liability, with caffeine." Brandon, M, 21, Uni, FG 3

"I just ranked V as worse [than Coca-Cola], yeah it's mainly stimulants or whatever, I don't know, whatever makes it an energy drink" Chris, M, 20, Uni, FG 4

While caffeine was of concern to participants, like sugar, participants did not know what quantity of caffeine in beverages should be considered harmful to health. However, unlike sugar, several participants spoke about the physiological effect of caffeine on their body.

"I saw the caffeine content [in the energy drink] is still 13, actually, it's actually pretty like, in milligrams, is that high or is that low?" Andrew, M, 20, Uni, FG 3. "I'm not 100% sure to be honest." Ryan, M, 19, Uni, FG 3

"I put V on top [least healthy] because the first time I had V, I think it's the only drink I've noticed the effect, like almost instantly on my body and I was like wow. I was scared the first time." Hunter, M, 19, Uni, FG 3. "You're feeling the fourth dimension." Isaac, M, 19, Uni, FG 3

3.2. Properties beneficial for health

3.2.1. Naturalness

Participants' perceptions of the naturalness of the beverage played an important role in the conceptualisation of beverage healthfulness. Naturalness as an indicator of beverage healthfulness was explicitly referred to by participants. Participants also discussed properties of beverages that indicated a low level of naturalness, for example the level of processing, additives and colours.

"I went by what looked the most natural" Kayla, F, 19, Uni, FG 1

"You can't see any natural thing except the water and the sugar in the Coke." Kelsey, F, 19, Uni, FG 2

"It [coconut water] just means nothing else has been added to it. So, I feel like that should make it better for you." Jacob, M, 18, TAFE, FG 6

"I think [Pump+] better than Powerade just coz it's clear" Chris, M, 20, Uni, FG 4

Water was viewed by participants across groups as the most natural beverage, commonly communicated by participants through reference to water having nothing else in it. Participants used how closely a beverage resembled water as an indication of how natural and healthy a beverage was.

"It's [water] just natural. It doesn't have all the extra stuff in it." Melissa, F, 22, TAFE, FG 7

"Straight coconut water is just as healthy as water because that's essentially what it is. Essentially it's just … plant drinks the water, the water seeps in, gets a bit flavoured by the coconut and everything else the plant has and stays there until somebody opens it. It's essentially water, but just a natural flavouring of coconut." Amanda, F, 20, TAFE, FG 5

"Sometimes when it tastes like water you can already tell. Like, if you compare Coke and water, there's a big difference in taste but if you compare like iced tea and water that one's just a bit more flavoured and sugar so you think oh I'm really not being that unhealthy." Hannah, F, 19, Uni, FG 1

"It just doesn't seem natural at all, so, it's like, very far removed from something like water." Chris, M, 20, Uni, FG 4

Participants also discussed naturalness in relation to sugar and did not consider 'natural' sugar bad for health when compared to 'added'

sugar. Participants were also concerned about artificial sweeteners and saw these are more harmful to health than sugar.

"I think it's [coconut water] more healthy because it's natural sugar ..." Rachel, F, 19, Uni, FG 2

"I've heard a lot of juices have like added sugar in it, that one didn't have added sugar apparently, so I was confused." Chris, M, 20, Uni, FG 4

"If they're natural sugar then it's, uh, I don't have any problem. But if it is too much artificial sugar then it's maybe problematic." Aaron, M, 24, Uni, FG 4

While naturalness of beverages was important in participants' conceptualisation of beverage healthfulness, participants commonly showed scepticism towards 'natural' and 'organic' claims made on the label of the novel Red Bull Organics Cola beverage as it did not align with how they overall would assess the beverage in terms of naturalness and healthfulness.

"It just looks fake. Like it says natural but it feels like they're lying to you." Courtney, F, 19, Uni, FG 1

"It sounds like it should be healthy but I don't know if there's too many health benefits to just cola, coz I've, I wouldn't think of it necessarily being natural, so the organic claim is a bit, I guess, unjustified." Michael, M, 19, Uni, FG 3

3.2.2. Nutritional value

Nutritional value was also a common theme in discussions across groups. Beverages that were perceived as having added nutrients were seen as healthier. Nutritional value appeared to be particularly relevant to participants' ranking of the relative healthfulness of beverages.

"So that [kombucha] seems like it's supposed to be like water, but all these added vitamins and stuff." Madison, F, 21, Uni, FG 2

"Kombucha, I know is like kind of fermented tea, black tea, so it's good for like digestion kind of things so I drink it." Rachel, F, 19, Uni, FG 2

"Well I know that coconut water has electrolytes in it. I don't know what they are but I know that they're good for you." Alexis, F, 18, TAFE, FG 7

"Then I put water [less healthy], coz water is just, hydration wise it is best, but nutrient wise it doesn't provide as much as the others." Isaac, M, 19, Uni, FG 3

3.2.3. Fruit juice

Many participants perceived juice to be a healthier option. Juices were viewed by some participants as equating to fruit consumption or as providing important nutrients to the consumer. While it was common for participants to identify that juice contained sugar, the perceived nutritional benefits appeared to offset concerns about sugar content for some participants.

"Well I like fresh fruit in the juice, so kind of mixed with um watermelon or, kinda the fruit it's just like, kinda the vitamin C, because it's hard to like grab an apple or grab multiple fruit at one day so I think one cup of the juice is yep" Rachel, F, 19, Uni, FG 2

"I mean the purpose of the juice is to give you vitamins so it's probably actually healthy but it's just got sugar." Hannah, F, 19, Uni, FG 1

"I think the orange juice is difficult because it's a lot of sugar intake, you shouldn't be drinking that much orange juice, but technically it's also healthy because it's fruit, so it's healthy if you don't have the whole thing I guess." Madison, F, 21, Uni, FG 2

3.3. Functionality

3.3.1. Necessity to the body

The functionality of a beverage also influenced how participants conceptualised beverage healthfulness. When a beverage was seen as a necessity, it was viewed as healthier, with necessity commonly constructed by participants as fulfilling what the body needs. This was often explicit in participants' discussion of beverages perceived as the healthiest and most unhealthy. For example, water was often described as a given necessity to the body while energy drinks and sodas were seen as unnecessary.

"I was kinda looking at like vitamins and minerals and what your body needs." Sam, M, 23, TAFE, FG 6

"Our body needs water whereas it doesn't really like need any of the others." Shelby, F, 20, TAFE, FG 5

"It [energy drink] seems like it's unnecessary and probably bad for you, if your body has all this crap that it has to deal with is." Renee, F, 24, Uni, FG 2

Participants also justified the consumption of beverages they otherwise viewed as the most unhealthy as addressing their immediate needs. For example, energy drinks and, for some participants, sodas were discussed as being consumed to combat fatigue and stress.

"If I feel like I need an energy drink to kick start me I'll just drink one" Jacob, M, 18, TAFE, FG 6

"I have like sugary drinks as a pick-me-up. Like, just as, if you're running low during the day." Kayla, F, 19, Uni, FG 1

"I guess they [energy drinks] provide a temporary benefit for students going through stressful times" Ryan, M, 19, Uni, FG 3

3.3.2. Contextual necessity and consumption

Participants also discussed the body's needs as being contextual. When a context was seen to create a necessity for beverages, participants conceptualised beverages as being healthy, or healthier, than if the beverage was to be considered or consumed outside of the context. In this regard, beverage consumption was constructed as addressing a specific purpose for participants.

"I put down Powerade as number 5 as being like reasonably healthy but only in certain circumstances. So, if you're extremely hungover and need the electrolytes or if you've been sweating loads and again need the electrolytes to balance it out." Stephanie, F, 18, Uni, FG 2

"If the drink doesn't have, doesn't serve its purpose then what's the point of drinking it?" Hannah, F, 19, Uni, FG 1

The context most discussed was exercise, with participants suggesting that sports drinks can be needed to replace a perceived loss during exercise. In these discussions, the perceived need for consuming these beverages were seen by participants as more important than concern for sugar content.

"I think it just depends on which way you view it. So if for example, you were stuck in a very isolated place with only a limited amount of liquid you would take, water would probably be your best choice, but if you were for example, going for a run and then you came back home tired, water might be a really good choice but you might want something that can help provide additional nutrients to help build up your body. So it just depends on what the objective you're looking for." Isaac, M, 19, Uni, FG 3

"Powerade [sports drink] has a great amount of sugar. It also has everything that the body loses because it is designed for exercise, and it pretty much puts back everything you lose when you sweat. Which you lose sugar, you lose salt and you lose water and that's

pretty much what they've done, they've just put all that in here." Amanda, F, 20, TAFE, FG 5

3.4. Packaging

3.4.1. Healthy 'look'

Participants focused on the packaging of beverages in their discussions about novel beverages they were unfamiliar with. Many participants saw the novel beverages as being healthier than comparable, more familiar beverages. However, participants were often unable to articulate why they thought this. Most participants made general comments about the product looking healthy, or healthier, than alternatives.

"I mean from the label it [V Pure] seems healthier than the Coke and the V drink" Hannah, F, 19, Uni, FG 1

"It's like they're trying to be healthier [Red Bull Organics Lemonade] so it's probably not as bad as like the V and Coke and stuff, but I also don't think it would be healthy, but it's probably better for you than the badder things" Melissa, F, 22, TAFE, FG 7 "Yeah it's like, it's packaged to look healthier than normal so it must be, because otherwise they wouldn't, you know, package it like that." Alexis, F, 18, TAFE, FG 7

"If I were buying something I would probably go for something like that [Emma & Tom's Iced Green Tea] or the coconut water or the kombucha because they look healthy" Madison, F, 21, Uni, FG 2

3.4.2. Claims and colour

Some participants also referred to specific claims, images and colours used on the beverage labels. These addressed wider participant discussions of ingredients seen as harmful to health or beverage properties seen as beneficial to health, as presented above.

"For me like, there's the antioxidants and no added sugar [points to claim on label], it's mainly people are buying it and trying it because it should be really healthy, so it's this kind of marketing that makes me want to buy this [Emma & Tom's Iced Green Tea]." Sam, M, 23, TAFE, FG 6

"It might feel stupid but those don't look like 'healthy' [air quotes] colours [Red Bull Organics Cola]." Kayla, F, 19, Uni, FG 1

3.4.3. Transparent packaging

Participants thought that a transparent package indicated a healthier beverage. Some participants suggested that transparent packaging was linked to transparency about the beverage, i.e. what you see is what you get.

"A lot of energy drinks are in cans like [points to energy drink] and so like when you see that it just, like you just think ehk, but in the bottle [V Pure] that's like what healthier drinks are in, like Kombucha and stuff." Alexis, F, 18, TAFE, FG 7

"In comparing the two V products, that one [V Pure] looks healthier because you can see inside of it." Madison, F, 21, Uni, FG 2

"The packaging is kinda friendly just coz it's see through [Emma & Tom's Iced Green Tea]" Kayla, F, 19, Uni, FG 1. "Yeah it feels less like you don't know what you're gonna get" Ashley, F, 19, Uni, FG 1

8. Discussion

This study has explored how young adults conceptualise the healthfulness of sugar-containing beverages. Much of the existing literature on consumer perceptions of sugar-containing beverages have focused on energy drinks (Bunting, Baggett, & Grigor, 2013; Costa, Hayley, & Miller, 2014; Francis et al., 2017; McCrory et al., 2017; Thornton & Collins, 2018; Visram, Crossley, Cheetham, & Lake, 2017; Wiggers, Reid, White, & Hammond, 2017) and sodas (Bere, Glomnes, te Velde, & Klepp, 2008; Hattersley et al., 2009) and in the current study these beverages were easily identified as unhealthy. Our study offers further insight into how sugar-containing beverages other than sodas and energy drinks are perceived in relation to health. Overall, we found that participants conceptualise beverage healthfulness through weighing beverage ingredients and properties they viewed as harmful to health against those viewed as beneficial to health, while also considering the context for consumption.

8.1. What information is used to conceptualise beverage healthfulness?

Sugar content, nutritional value, naturalness and functionality were important factors participants considered in their conceptualisation of beverage healthfulness. Participants suggested that sugar content was a primary indicator of how healthy a beverage was but lacked knowledge about the amount of sugar in beverages, and how much should be considered harmful for health. This finding is consistent with previous research (Hattersley et al., 2009; Hess et al., 2019; Miller, Braunack-Mayer et al., 2019; Miller, Wakefield, et al., 2019; Rampersaud, Kim, Gao, & House, 2014). We found that without an understanding of how much sugar consumption is harmful to health, participants used a less is better-for-you approach. In practice, without a clear reference point to healthy sugar consumption limits, the average sugar content of sugar-containing beverages may set a point of reference so that beverages with relatively less, but nevertheless high, sugar content are more readily accepted and selected by consumers (Jahn, Schuch-Haellmigk, Dannewald, & Boztug, 2018).

When participants viewed beverages as more natural and/or offering nutritional value they also conceptualised them as healthier. Research has consistently shown that foods viewed to be natural are perceived as healthy by consumers (Román, Sánchez-Siles, & Siegrist, 2017). Research has also shown that consumers perceive the relationship between nutrient intake and biological functioning to be linear rather than curvilinear (Mariotti, Kalonji, Huneau, & Margaritis, 2010). Of particular note, some participants conceptualised beverages they viewed as having high nutritional value as superior to water. Conceptualising beverages this way aligns with other research which has found that young adults do not see bottled water as good value for money when compared to sodas (Hattersley et al., 2009). Consumer research has also shown that millennial consumers are increasingly concerned with added nutritional value (Hilton, 2017; Vukasović, 2017). Further, we found that, despite identifying ingredients and properties that were seen to increase nutritional value, participants were unable to articulate why they thought this to be the case. Sports drinks were an exception, with participants readily explaining that electrolytes in sports drinks functioned to replace what was depleted from the body during exercise. This aligns very closely with the ways in which sports drinks are marketed (Brownbill et al., 2018a; 2018b) and it has previously been found that one in six children identify sports drinks rather than water as the best drink during physical activity (Fairchild, Broughton, & Morgan, 2017). Therefore public health measures should go beyond simply promoting water as the best option to address misconceptions that water is not always the healthiest beverage option.

Beverage packaging acted as a cue to participants in identifying the factors participants considered important in their conceptualisation of beverage healthfulness. The factors identified as influencing the way participants conceptualised beverage healthfulness aligns with how sugar-containing beverages are advertised on labels (Brownbill et al., 2018a). This suggests that current labelling regulation in Australia is not sufficiently preventing misleading health and nutrition related advertising on sugar-containing beverages. We further found that transparent packaging was associated with healthier beverages by

participants. This may be the effect of 'clean label' marketing techniques through which simple and clear packaging along with simple ingredient listing are used to address perceived naturalness of products (Román et al., 2017). Clean labelling may be more effective at influencing young adults' perceptions as they prefer an 'authentic' feel from a product rather than natural used as a descriptor on package (Beverage Industry, 2019). This was evident in the current study in participants' views of 'natural' and 'certified organic' claims on Red Bull Organics Cola, with participants not finding this to be a credible claim. This is likely the result of participants viewing energy drinks as unhealthy, with previous research suggesting that the effect of health and nutrition claims can be reduced when they do not match consumers' perceived healthfulness of the product (Steinhauser & Hamm, 2018).

8.2. How is sugar weighed up against other beverage attributes?

Participants easily identified the beverages they perceived to be the healthiest and least healthy. For beverages that fell between the extremities of the healthiest and least healthy, more emphasis was placed on beverage naturalness and nutritional value than on sugar content. Previous research has similarly shown that consumers often focus more on added nutrients than unhealthy ingredients and that added nutrients can be seen to counteract the effect of unhealthy ingredients (Cornish, 2012; Steinhauser & Hamm, 2018). A study exploring young adults' evaluation of the nutritiousness of snack foods also found that young adults focus more on positive aspects of snack foods while disregarding less healthy aspects (De Vlieger, Collins, & Bucher, 2017). The study similarly found that while young adults commonly cited sugar content when defining a nutritious food, naturalness was cited almost twice as often than sugar content when ranking snack food nutritiousness (De Vlieger et al., 2017). We found that naturalness was also important when assessing the sugar content of beverages, with natural sugar viewed as healthier than added sugar or artificial sweeteners. Similar findings have been reported in previous research (Block, Gillman, Linakis, & Goldman, 2013; Rampersaud et al., 2014; Tierney, Gallagher, Giotis, & Pentieva, 2017). Therefore the type of sugar or sweetener may also mediate consumers concern about the amount of sugar.

We further found that functionality of beverages may negate concern about sugar content. Participants suggested that different beverages serve different purposes and are needed in certain contexts with sugar consumption seen as justified in these contexts. This may be because consumption can address the immediate needs of the consumer, while the health consequences of sugar-containing beverage consumption are considered long term and therefore of low personal relevance to young adults (Hattersley et al., 2009; Miller, Braunack-Mayer et al., 2019). Future research could explore whether presenting health related information within a shorter term context resonates with young adults.

8.3. Implications

Our findings suggest that young adults' conceptualisation of what makes a beverage healthy align with the health-related commercial marketing of sugar-containing beverages. This includes marketing that overtly position sugar-containing beverages as healthy, such as the use of nutrition content claims (Brownbill et al., 2018a; Dachner et al., 2015; Franco-Arellano, Bernstein, Norsen, Schermel, & L'Abbé, 2017; Harris et al., 2014; Mediano Stoltze et al., 2018), and marketing that does this subtly, such as through the use of sport (Bragg, Roberto, Harris, Brownell, & Elbel, 2018; Brownbill et al., 2018b, 2018a; Emond, Smith, Mathur, Sargent, & Gilbert-Diamond, 2015; Mediano Stoltze et al., 2018; Perry et al., 2018). While labelling is one route of health-related marketing for sugar-containing beverages (Brownbill et al., 2018a; Dachner et al., 2015; Franco-Arellano et al., 2017; Harris et al., 2014; Kaur et al., 2015; Mediano Stoltze et al., 2018; Perry et al., 2018), and is the example we have used in this study, it is important to recognise that young people are exposed to health-related marketing messages for sugar-containing beverages in many ways. For example, previous research has observed health-related messaging in television advertisements for sugar-containing beverages (Emond et al., 2015; Prell, Palmblad, Lissner, & Berg, 2011; Royo-Bordonada, Bosqued-Estefanía, Damian, Lopez-Jurado, & Moya-Geromini, 2016) and in content shared by sugar-containing beverage brands on social media platforms (Boelsen-Robinson, Backholer, & Peeters, 2016; Brownbill et al., 2018b; Freeman et al., 2014; Vassallo et al., 2018). Young people may be particularly receptive to the marketing delivered via social media platforms due to the brand-consumer engagement opportunities afforded and encouraged by sugar-containing beverage brands on these platforms (Brownbill et al., 2018b; Buchanan, Yeatman, Kelly, & Kariuppanon, 2018a, 2018b; Dunlop, Freeman, & Jones, 2016; Holmberg, Chaplin, Hillman, & Berg, 2016). Young people are therefore not only receiving commercial marketing messages about health and nutrition, but also amplifying and reinforcing them through their peer networks on social media platforms by engaging with this content (Holmberg et al., 2016, 2018). More stringent regulation is required across all forms of health-related marketing by sugar-containing beverage manufacturers given these marketing practices may mislead consumers to more positively assess the healthfulness of sugar-containing beverages and undermine public health efforts.

8.4. Limitations

Our sample is limited to young English-speaking adults who have engaged in vocational or university level education. Therefore, findings cannot be generalised to all young adults as conceptualisations of beverage healthfulness may differ among those with lower educational attainment, of different ages and who come from certain migrant groups who may have been excluded by language criteria. While we were primarily interested in young adults as a population group with high consumption of sugar-containing beverages, and participants indicated they consume a range of beverages, we did not measure participant's consumption of sugar-containing beverages. A previous population study in South Australia, where this study was conducted, found that frequent consumption of sugar-containing beverages is higher among those aged 15–24 years, those with lower education and those living in areas of the highest disadvantage (Miller, Wakefield, et al., 2019). Therefore, the inclusion criteria for this study which captured participants with vocational or university education may have resulted in a sample with lower consumption. Future research could explore how conceptualisation of sugar-containing beverage healthfulness differs by level of consumption. Greater insight may be particularly gained through conducting research with frequent consumers of beverages that are viewed as better-for-you. Further, while we were particularly interested in exploring health-related views about sugar-containing beverages it was also evident that health may not be the primary reason for selection of beverages among young people. Previous research has indicated that price and taste are important cues for consumption of sugar-containing beverages among young adults (Block et al., 2013; Hattersley et al., 2009).

9. Conclusions

While young adults are aware that beverages can contain high amounts of sugar, and that this can be harmful to health, many other factors influence young adults' conceptualisation of beverage healthfulness. Public health interventions and policies are needed to address misperceptions about the healthfulness of sugar-containing beverages to better put the harms of high sugar consumption in perspective for consumers. Properties and packaging of beverages also influence how young adults conceptualise beverage healthfulness and public health policies should aim to prevent the misleading advertising of sugar-containing beverages as healthy.

Financial support

Funding for this study was provided by an Australian Government Research Training Program Scholarship (AB) and an Ian Wilson Liberal Research Scholarship (AB). The funders were not involved in the study design or collection, analysis and interpretation of data, thus the authors were independent of the funder. It was the authors' decision to publish the findings of this study and the funders were not involved in the preparation of this manuscript.

Authors' contributions

AB facilitated and transcribed the focus groups. AB coded and analysed the data, with scientific input from CM and ABM. AB drafted the article. All authors contributed to the conceptualisation and design of the study and reviewed and revised the final version of the article.

Ethical standards disclosure

We obtained ethics approval from The University of Adelaide Human Research Ethics Committee (approval number H-2018-057). All participants involved in this research gave written informed consent before participating and consent was confirmed verbally before recording devices were turned on during focus groups.

Declaration of competing interest

None.

Acknowledgements

The authors are grateful to the young adults who participated in this research and would like to acknowledge Ms Joanne Dono and Dr Kerry Ettridge for their help during the conducting of the study's focus groups.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2020.104675.

References

Battram, D. S., Piche, L., Beynon, C., Kurtz, J., & He, M. (2016). Sugar-sweetened beverages: Children's perceptions, factors of influence, and suggestions for reducing intake. *Journal of Nutrition Education and Behavior, 48*(1), 27–34. https://doi.org/10.1016/j.jneb.2015.08.015 e21.

Bere, E., Glomnes, E. S., te Velde, S. J., & Klepp, K. I. (2008). Determinants of adolescents' soft drink consumption. *Public Health Nutrition, 11*(1), 49–56. https://doi.org/10.1017/S1368980007000122.

Bernabe, E., Vehkalahti, M. M., Sheiham, A., Aromaa, A., & Suominen, A. L. (2014). Sugar-sweetened beverages and dental caries in adults: A 4-year prospective study. *Journal of Dentistry, 42*(8), 952–958. https://doi.org/10.1016/j.jdent.2014.04.011.

Beverage Industry (2019). *Holistic nutrition proves to be tailored across age groups*. from www.bevindustry.com/articles/92356-holistic-nutrition-proves-to-be-tailored-across-age-groups?id=92356-holistic-nutrition-proves-to-be-tailored-across-age-groups&oly_enc_id=5346E1974723H7Z, Accessed date: 10 October 2019.

Block, J. P., Gillman, M. W., Linakis, S. K., & Goldman, R. E. (2013). "If it tastes good, I'm drinking it": Qualitative study of beverage consumption among college students. *Journal of Adolescent Health, 52*(6), 702–706. https://doi.org/10.1016/j.jadohealth.2012.11.017.

Boelsen-Robinson, T., Backholer, K., & Peeters, A. (2016). Digital marketing of unhealthy foods to Australian children and adolescents. *Health Promotion International, 31*(3), 523–533. https://doi.org/10.1093/heapro/dav008.

Bragg, M. A., Roberto, C. A., Harris, J. L., Brownell, K. D., & Elbel, B. (2018). Marketing food and beverages to youth through sports. *Journal of Adolescent Health, 62*(1), 5–13. https://doi.org/10.1016/j.jadohealth.2017.08.016.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa.

Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Liamputtong (Ed.). *Handbook of research methods in health social sciences* (pp. 843–860). Singapore: Springer.

Brownbill, A. L., Miller, C. L., & Braunack-Mayer, A. J. (2018a). Industry use of 'better-for-you' features on labels of sugar-containing beverages. *Public Health Nutrition, 21*(18), 3335–3343. https://doi.org/10.1017/S1368980018002392.

Brownbill, A. L., Miller, C. L., & Braunack Mayer, A. J. (2018b). The marketing of sugar-sweetened beverages to young people on Facebook. *Australian & New Zealand Journal of Public Health, 42*(4), 327–414. https://doi.org/10.1111/1753-6405.12801.

Buchanan, L., Kelly, B., & Yeatman, H. (2017). Exposure to digital marketing enhances young adults' interest in energy drinks: An exploratory investigation. *PloS One, 12*(2), e0171226. https://doi.org/10.1371/journal.pone.0171226.

Buchanan, L., Yeatman, H., Kelly, B., & Karlippanon, K. (2018a). Digital promotion of energy drinks to young adults is more strongly linked to consumption than other media. *Journal of Nutrition Education and Behavior, 50*(9), 888–895. https://doi.org/10.1016/j.jneb.2018.05.022.

Buchanan, L., Yeatman, H., Kelly, B., & Karlippanon, K. (2018b). A thematic content analysis of how marketers promote energy drinks on digital platforms to young Australians. *Australian & New Zealand Journal of Public Health, 42*(6), 530–531. https://doi.org/10.1111/1753-6405.12840.

Bucher, T., & Siegrist, M. (2015). Children's and parents' health perception of different soft drinks. *British Journal of Nutrition, 113*(3), 526–535. https://doi.org/10.1017/s0007114514004073.

Bunting, H., Baggett, A., & Grigor, J. (2013). Adolescent and young adult perceptions of caffeinated energy drinks: A qualitative approach. *Appetite, 65*(1), 132–138. https://doi.org/10.1016/j.appet.2013.02.011.

Cornish, L. S. (2012). It's good for me: It has added fibre! an exploration of the role of different categories of functional foods in consumer diets. *Journal of Consumer Behaviour, 11*(4), 292–302. https://doi.org/10.1002/cb.1388.

Costa, B. M., Hayley, A., & Miller, P. (2014). Young adolescents' perceptions, patterns, and contexts of energy drink use: A focus group study. *Appetite, 80*(1), 183–189. https://doi.org/10.1016/j.appet.2014.05.013.

Dachner, N., Mendelson, R., Sacco, J., & Tarasuk, V. (2015). An examination of the nutrient content and on-package marketing of novel beverages. *Applied Physiology Nutrition and Metabolism, 40*(2), 191–198. https://doi.org/10.1139/apnm-2014-0252.

De Vlieger, N. M., Collins, C., & Bucher, T. (2017). What is a nutritious snack? Level of processing and macronutrient content influences young adults' perceptions. *Appetite, 114*, 55–63. https://doi.org/10.1016/j.appet.2017.03.021.

Dunlop, S., Freeman, B., & Jones, S. C. (2016). Marketing to youth in the digital age: The promotion of unhealthy products and health promoting behaviours on social media. *Media and Communication, 4*, 35+.

Eisenberg, M. E., Larson, N. I., Gollust, S. E., & Neumark-Sztainer, D. (2017). What are we drinking? Beverages shown in adolescents' favorite television shows. *Journal of the Academy of Nutrition and Dietetics, 117*(5), 763–769. https://doi.org/10.1016/j.jand.2016.12.004.

Eli, K., Hornell, A., Etminan Malek, M., & Nowicka, P. (2017). Water, juice, or soda? Mothers and grandmothers of preschoolers discuss the acceptability and accessibility of beverages. *Appetite, 112*, 133–142. https://doi.org/10.1016/j.appet.2017.01.011.

Emond, J. A., Smith, M. E., Mathur, S. J., Sargent, J. D., & Gilbert-Diamond, D. (2015). Children's food and beverage promotion on television to parents. *Pediatrics, 136*(6), 1095–1102. https://doi.org/10.1542/peds.2015-2853.

Euromonitor International (2016). *Better for you beverages in Australia*. Sydney, Australia.

Fairchild, R. M., Broughton, D., & Morgan, M. Z. (2017). Knowledge of and attitudes to sports drinks of adolescents living in South Wales, UK. *British Dental Journal, 222*(12), 931–935. https://doi.org/10.1038/sj.bdj.2017.542.

Fletcher, A. J. (2017). Applying critical realism in qualitative research: Methodology meets method. *International Journal of Social Research Methodology, 20*(2), 181–194. https://doi.org/10.1080/13645579.2016.1144401.

Francis, J., Martin, K., Costa, B., Christian, H., Kaur, S., Harray, A., & Trapp, G. (2017). Informing intervention strategies to reduce energy drink consumption in young people: Findings from qualitative research. *Journal of Nutrition Education and Behavior, 49*(9), 724–733. https://doi.org/10.1016/j.jneb.2017.06.007.

Franco-Arellano, B., Bernstein, J. T., Norsen, S., Schermel, A., & L'Abbé, M. R. (2017). Assessing nutrition and other claims on food labels: A repeated cross-sectional analysis of the Canadian food supply. *BMC Nutrition, 3*(1), 74. https://doi.org/10.1186/s40795-017-0192-9.

Freeman, B., Kelly, B., Baur, L., Chapman, K., Chapman, S., Gill, T., et al. (2014). Digital junk: Food and beverage marketing on facebook. *American Journal of Public Health, 104*(12), 56–64. https://doi.org/10.2105/AJPH.2014.302167.

Freeman, B., Kelly, B., Vandevijvere, S., & Baur, L. (2015). Young adults: Beloved by food and drink marketers and forgotten by public health? *Health Promotion International, 31*(4), 954–961. https://doi.org/10.1093/heapro/dav081.

Gupta, A., Smithers, L. G., Braunack-Mayer, A., & Harford, J. (2018). How much free sugar do Australians consume? Findings from a national survey. *Australian & New Zealand Journal of Public Health, 42*(6), 533–540. https://doi.org/10.1111/1753-6405.12836.

Harris, J., Schwartz, M., LoDolce, M., Munsell, C., Fleming-Milici, F., Elsey, J., ... Dembek, C. (2014). Sugary drink FACTS 2014: Some progress but much room for improvement in marketing to youth. *Rudd center for food policy & obesity*.

Hattersley, L., Irwin, M., King, L., & Allman-Farinelli, M. (2009). Determinants and patterns of soft drink consumption in young adults: A qualitative analysis. *Public Health Nutrition, 12*(10), 1816–1822. https://doi.org/10.1017/S1368980008004628.

Hennessy, M., Bleakley, A., Piotrowski, J. T., Mallya, G., & Jordan, A. (2015). Sugar-sweetened beverage consumption by adult caregivers and their children: The role of drink features and advertising exposure. *Health Education & Behavior, 42*(5), 677–686. https://doi.org/10.1177/1090198115577379.

Hess, J. M., Lilo, E. A., Cruz, T. H., & Davis, S. M. (2019). Perceptions of water and sugar-sweetened beverage consumption habits among teens, parents and teachers in the rural south-western USA. *Public Health Nutrition, 22*(8), 1376–1387. https://doi.org/

10.1017/s1368980019000272.
Hilton, J. (2017). Growth patterns and emerging opportunities in nutraceutical and functional food categories: Market overview. In D. Bagchi, & S. Nair (Eds.). *Developing new functional food and nutraceutical products* (pp. 1–28). Academic Press.
Holmberg, C., Berg, C., Dahlgren, J., Lissner, L., & Chaplin, J. E. (2018). Health literacy in a complex digital media landscape: Pediatric obesity patients' experiences with online weight, food, and health information. *Health Informatics Journal, 25*(4), 1343–1357. https://doi.org/10.1177/1460458218759699.
Holmberg, C., Chaplin, E., J, Hillman, T., & Berg, C. (2016). Adolescents' presentation of food in social media: An explorative study. *Appetite, 99*, 121–129. https://doi.org/10.1016/j.appet.2016.01.009.
Horowitz, J. A., Vessey, J. A., Carlson, K. L., Bradley, J. F., Montoya, C., & McCullough, B. (2003). Conducting school-based focus groups: Lessons learned from the CATS project. *Journal of Pediatric Nursing, 18*(5), 321–331. https://doi.org/10.1016/s0882-5963(03)00104-0.
Imamura, F., O'Connor, L., Ye, Z., Mursu, J., Hayashino, Y., Bhupathiraju, S. N., et al. (2016). Consumption of sugar sweetened beverages, artificially sweetened beverages, and fruit juice and incidence of type 2 diabetes: Systematic review, meta-analysis, and estimation of population attributable fraction. *British Journal of Sports Medicine, 50*(8), 496–504. https://doi.org/10.1136/bjsports-2016-h3576rep.
Jahn, S., Schuch-Haellmigk, J., Dannewald, T., & Boztuğ, Y. (2018). How category average reference points affect choice of sugary foods. *Appetite, 126*, 201–209. https://doi.org/10.1016/j.appet.2018.04.001.
Kaur, A., Scarborough, P., Matthews, A., Payne, S., Mizdrak, A., & Rayner, M. (2015). How many foods in the UK carry health and nutrition claims, and are they healthier than those that do not? *Public Health Nutrition, 19*(6), 988–997. https://doi.org/10.1017/s1368980015002104.
Kaur, A., Scarborough, P., & Rayner, M. (2017). A systematic review, and meta-analyses, of the impact of health-related claims on dietary choices. *International Journal of Behavioral Nutrition and Physical Activity, 14*(1), 93–110. https://doi.org/10.1186/s12966-017-0548-1.
Kim, H., & House, L. A. (2014). Linking consumer health perceptions to consumption of nonalcoholic beverages. *Agricultural & Resource Economics Review, 43*(1), 1–16. https://doi.org/10.1017/S1068280500006870.
Liamputtong, P. (2013). Methodological frameworks and sampling. In P. Liamputtong (Ed.). *Qualitative research methods* (pp. 5–22). (4th ed.). South Melbourne: Oxford University Press.
Lundeen, E. A., Park, S., Pan, L., & Blanck, H. M. (2018). Daily intake of sugar-sweetened beverages among US adults in 9 states, by state and sociodemographic and behavioral characteristics, 2016. *Preventing Chronic Disease, 15*, E154. https://doi.org/10.5888/pcd15.180335.
Malik, V. S. (2017). Sugar sweetened beverages and cardiometabolic health. *Current Opinion in Cardiology, 32*(5), 572–579. https://doi.org/10.1097/hco.0000000000000439.
Malik, V. S., Pan, A., Willett, W. C., & Hu, F. B. (2013). Sugar-sweetened beverages and weight gain in children and adults: A systematic review and meta-analysis. *American Journal of Clinical Nutrition, 98*(4), 1084–1102. https://doi.org/10.3945/ajcn.113.058362.
Malik, V. S., Popkin, B. M., Bray, G. A., Despres, J. P., Willett, W. C., & Hu, F. B. (2010). Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: A meta-analysis. *Diabetes Care, 33*(11), 2477–2483. https://doi.org/10.2337/dc10-1079.
Mariotti, F., Kalonji, E., Huneau, J. F., & Margaritis, I. (2010). Potential pitfalls of health claims from a public health nutrition perspective. *Nutrition Reviews, 68*(10), 624–638. https://doi.org/10.1111/j.1753-4887.2010.00322.x.
McCrory, C., White, C. M., Bowman, C., Fenton, N., Reid, J. L., & Hammond, D. (2017). Perceptions and knowledge of caffeinated energy drinks: Results of focus groups with canadian youth. *Journal of Nutrition Education and Behavior, 49*(4), 304–311. https://doi.org/10.1016/j.jneb.2016.11.013.
Mediano Stoltze, F., Barker, J. O., Kanter, R., Corvalan, C., Reyes, M., Taillie, L. S., et al. (2018). Prevalence of child-directed and general audience marketing strategies on the front of beverage packaging: The case of Chile. *Public Health Nutrition, 21*(3), 454–464. https://doi.org/10.1017/s1368980017002671.
Miller, C., Braunack-Mayer, A., Wakefield, M., Roder, D., O'Dea, K., Dono, J., et al. (2019a). "When we were young, it really was a treat; now sugar is just the norm every day"—a qualitative study of parents' and young adults' perceptions and consumption of sugary drinks. *Health Promotion Journal of Australia*. https://doi.org/10.1002/hpja.257.
Miller, C., Wakefield, M., Braunack-Mayer, A., Roder, D., O'Dea, K., Ettridge, K., et al. (2019b). Who drinks sugar sweetened beverages and juice? An Australian population study of behaviour, awareness and attitudes. *BMC Obesity, 6*(1), 1–12. https://doi.org/10.1186/s40608-018-0224-2.
Moran, A. J., & Roberto, C. A. (2018). Health warning labels correct parents' misperceptions about sugary drink options. *American Journal of Preventive Medicine, 55*(2), e19–e27. https://doi.org/10.1016/j.amepre.2018.04.018.
Munsell, C. R., Harris, J. L., Sarda, V., & Schwartz, M. B. (2016). Parents' beliefs about the healthfulness of sugary drink options: Opportunities to address misperceptions. *Public Health Nutrition, 19*(1), 46–54. https://doi.org/10.1017/S1368980015000397.
Perry, A., Chacon, V., & Barnoya, J. (2018). Health claims and product endorsements on child-oriented beverages in Guatemala. *Public Health Nutrition, 21*(3), 627–631. https://doi.org/10.1017/s1368980017003123.
Popkin, B. M., & Hawkes, C. (2016). Sweetening of the global diet, particularly beverages: Patterns, trends, and policy responses. *The lancet. Diabetes & Endocrinology, 4*(2), 174–186. https://doi.org/10.1016/s2213-8587(15)00419-2.
Powell, L. M., Wada, R., Khan, T., & Emery, S. L. (2017). Food and beverage television advertising exposure and youth consumption, body mass index and adiposity outcomes. *Canadian Journal of Economics, 50*(2), 345–364. https://doi.org/10.1111/caje.12261.
Prell, H., Palmblad, E., Lissner, L., & Berg, C. M. (2011). Health discourse in Swedish television food advertising during children's peak viewing times. *Appetite, 56*(3), 607–616. https://doi.org/10.1016/j.appet.2011.01.033.
QSR International Pty Ltd (2016). *NVivo qualitative data analysis Software*. Version 11.
Rampersaud, G. C., Kim, H., Gao, Z., & House, L. A. (2014). Knowledge, perceptions, and behaviors of adults concerning nonalcoholic beverages suggest some lack of comprehension related to sugars. *Nutrition Research, 34*(2), 134–142. https://doi.org/10.1016/j.nutres.2013.11.004.
Román, S., Sánchez-Siles, L. M., & Siegrist, M. (2017). The importance of food naturalness for consumers: Results of a systematic review. *Trends in Food Science & Technology, 67*(Supplement C), 44–57. https://doi.org/10.1016/j.tifs.2017.06.010.
Royo-Bordonada, M. A., Bosqued-Estefanía, M. J., Damian, J., Lopez-Jurado, L., & Moya-Geromini, M. A. (2016). Nutrition and health claims in products directed at children via television in Spain in 2012. *Gaceta Sanitaria, 30*(3), 221–226. https://doi.org/10.1016/j.gaceta.2016.01.004.
Steinhauser, J., & Hamm, U. (2018). Consumer and product-specific characteristics influencing the effect of nutrition, health and risk reduction claims on preferences and purchase behavior – a systematic review. *Appetite, 127*, 303–323. https://doi.org/10.1016/j.appet.2018.05.012.
Thornton, J., & Collins, W. B. (2018). Underlying beliefs associated with college student consumption of energy beverages. *Western Journal of Nursing Research, 40*(1), 5–19. https://doi.org/10.1177/0193945916686961.
Tierney, M., Gallagher, A., Giotis, E., & Pentieva, K. (2017). An online survey on consumer knowledge and understanding of added sugars. *Nutrients, 9*(1), 37. https://doi.org/10.3390/nu9010037.
Vassallo, J. A., Kelly, B., Zhang, L., Wang, Z., Young, S., & Freeman, B. (2018). Junk food marketing on Instagram: Content analysis. *JMIR Public Health and Surveillance, 4*(2), e54. https://doi.org/10.2196/publichealth.9594.
Visram, S., Crossley, S. J., Cheetham, M., & Lake, A. (2017). Children and young people's perceptions of energy drinks: A qualitative study. *PloS One, 12*(11), e0188668. https://doi.org/10.1371/journal.pone.0188668.
Vukasović, T. (2017). Functional foods in line with young consumers: Challenges in the marketplace in Slovenia. In D. Bagchi, & S. Nair (Eds.). *Developing new functional food and nutraceutical products* (pp. 391–405). Academic Press.
Wiggers, D., Reid, J. L., White, C. M., & Hammond, D. (2017). Use and perceptions of caffeinated energy drinks and energy shots in Canada. *American Journal of Preventive Medicine, 53*(6), 866–871. https://doi.org/10.1016/j.amepre.2017.05.021.
World Health Organization (2015). *Guideline: Sugar intake for adults and children*. Geneva: World Health Organization.

Appendix E – Study 1 coding framework for categorising beverage types

Beverage Types	Definition	Examples
Alcohol Substitute	Products labelled as "non-alcoholic" or "alcohol removed", positioned as substitutes for alcoholic beverages. Does not include ginger beer (coded as soda).	Non-alcoholic shiraz, non-alcoholic sauvignon blanc, non-alcoholic chardonnay, cocktail mix.
Concentrate	A concentrated sweetened beverage which is made to mix with water. These are described as “cordial”, “concentrate” or “syrup” on packaging.	Cordial, syrup, soda streams, ‘water enhancement drops’ such as Lqd+.
Coconut Water, Flavoured	Water from coconuts that is flavoured or sweetened, describes as “coconut water” on packaging (<100% coconut water).	Cocobella, H2Coco and Coconut Collective coconut waters (<100%/flavoured)
Coconut Water, Plain	Water from coconuts that is not sweetened describes as “coconut water” (100% coconut water).	Cocobella, H2Coco and Coconut Collective coconut waters (100%)
Energy Drink	Products labelled as "energy drinks" or "energy supplements" that usually contain high levels of caffeine (typically 80mg per serve or greater).	Red Bull, Monster Energy, Rockstar, V Energy.
Fruit Drink	Fruit/vegetable and/or plant flavoured drinks that are positioned as a fruit drink with 6% to 50% fruit/vegetable and/or plant juice.	Fruit drinks, fruit juice drinks, flavoured aloe vera water.
Iced Tea	Ready to drink teas, these contain the description of “tea” on the packaging.	Lipton, Real Iced Tea Co, Fuze Tea, AriZona, Stolen Recipe and Ovi Hydration iced teas. Includes green iced teas and kombucha.
Juice	Juice which contains 51%-99% fruit, vegetable and plant juice. This includes juices with nuts/legumes, coconut, spices, herbs, fungi, seeds and algae, as in line with the FSANZ Code for nutrient profiling.	Apple/orange juice, tomato/carrot juice, fruit/vegetable blends/smoothies (51-99%).
Juice, 100%	Juice in which sugar only occurs from fruit, vegetable and/or plant juice and do not contain added sugars. This includes juices with nuts/legumes, coconut, spices, herbs, fungi, seeds and algae, as in line with the FSANZ Code for nutrient profiling.	Apple/orange juice, tomato/carrot juice, fruit/vegetable blends/smoothies (100%).

Other	**Drinks that do not fall into the above categories. When analysed only probiotic drinks were coded under this category.**	**Probiotic drinks.**
Soda	Carbonated, sweetened beverages.	Cola, lemonade, ginger beer, Fanta, cream soda, sarsaparilla.
Sports Drink	Products marketed as accompanied with physical activity or for the rapid replacement of water, carbohydrates, electrolytes or minerals, which are labelled as "sports", "electrolyte" or "isotonic".	Powerade, Maximus, Gatorade and Sqwincher sports drinks. Ipro Sport isotonic drink. Mizone sports water. Roar electrolyte drink.
Water, Flavoured Mineral	Carbonated sweetened drinks describes as "mineral water" on the product container or that contains "mineral water" in the drink name.	Kyneton Springs, Waterfords, Hartz, Bickfords and Capi flavoured sparkling mineral water.
Water, Flavoured Still	Non-carbonated sweetened drinks described as "water beverages" on the product container or that contains the word "water" in the drink name. Excludes coconut water.	Pump flavoured water, Glaceau Vitamin Water.
Water, Plain Sparkling	Carbonated products labelled as "water" that are not sweetened.	Sparkling water
Water, Plain Still	Non-carbonated products labelled as "water" that are not sweetened.	Still water

Appendix F – Study 1 coding framework for better-for-you features on the labels of beverages

Category	Definition	Codes
Dietary Restrictions	Text or symbols that state a product is free from common dietary allergies/intolerances and requirements.	• A claim that the product is gluten 'free' or 'low'.* • A claim that the product is dairy or lactose 'free' or 'low'.* • A claim that the product is vegetarian or vegan.
Energy and Sugar Content	Text on packaging that refers to the kilojoule related aspects of the beverage including sugar specific aspects.	• A statement that the product has 'no added sugars'.* • A statement that the product has 'no concentrates'/ 'is not from concentrate'.* • Terms used to suggest that the sugar in a product is natural such as 'naturally sweetened' or 'natural X sugar' or 'sugar from fruit'/ 'fruit sugar'. • A general statement which suggests that the product is low in kilojoules such as 'light', 'reduced', 'diet' or 'low kj/calorie'.* • A statement suggesting that the product has no or low fat/cholesterol.* • A statement which suggests that the beverage is low/reduced in sugar such as 'low in sugar', '% sugar free, 'reduced sugar' or 'X% less sugar'.* • A statement that the product is 'unsweetened'.*
Fruit or vegetables	The presence of fruit and vegetables mentioned outside of the ingredient list.	• Fruit or vegetable products mentioned in text including within the brand name and flavours. • Images of fruit or vegetables. • The mention of foods that popular media portray as "super foods"[a] and/or the use/insinuation of the product containing "super food". ◦ List the superfood/s mentioned. • The serving or percentage of fruit or vegetable stated.

Goodness	**The mention of good that suggests the product may be a healthy choice through using descriptors of good/good for you or goodness which can be used to symbolise nutritious.**	• **The use of terms such as 'good', 'goodness' or 'better' in the context of better-for-you.** • **List the context of the term.**

Health	Features which are specifically relevant to health such as general mentions of health and wellness and health claims.	• The general use of words related to health such as 'health' or 'healthy'.
		• The use of terms such as 'wellness', 'wellbeing', 'feel great', 'refresh' or 'revitalise'.
		• Claims that suggest or imply that the beverage or a property of the beverage has, or may have, a health-related effect (for example fruit and vegetables contribute to heart health or calcium assists in energy metabolism).**
		  • General level health claim – reference to a health effect that is not a high-level health claim.**
		  • High level health claim – reference to a serious disease or biomarker of a serious disease.**

Natural	Text on packaging that suggests the product, or parts of the product, have the property of "natural". This includes the use of 'natural flavour' but excludes when a statement is specifically about 'natural sugars' or 'naturally sweetened' as this will be coded elsewhere (energy and sugar content).	• The use of the general term 'natural'. • The use of the term 'organic'. • The use of the terms 'pure' or 'raw'. • The use of the term 'real' in relation to the ingredients or product. • The use of the term 'fresh' in relation to the ingredients or product. • A statement about the products not containing 'artificial' products such as no: additives, preservatives, chemicals, pesticides, GMO, artificial colours or flavours.
Nutrition	Features that suggest the product is specifically nutritious, mentioned outside of the ingredient list/nutrient information panel.	• The use of general terms relating to nutrition such as: 'nutrition', 'nutritious', 'nutritional' or 'nourishing'. • Mentioning the presence of nutrients, vitamins, minerals or antioxidants (i.e. contains vitamins/minerals or contains vitamin C). This excludes the broad term "electrolyte/s" as these are coded elsewhere (sport).*

Sport	**Features that positions the beverage as assisting with physical activity or sports performance.**	• **The use of the terms such as 'hydration', 'hydrate' or 'rehydrate'.** • **The use of the broad term 'electrolytes'.*** • **The use of terms such as 'sport', 'exercise', 'physical activity', or imagery of these.** • **The use of properties other than electrolytes that may be associated with sport performance such as 'isotonic', 'ionic' or 'hypotonic'.** • **The use of the term 'performance'.**

* Indicates claims comprising nutrition content claims

** Indicates claims comprising health claims

[a] To code for superfoods a web search was conducted for articles that listed superfoods from health celebrities, popular media and other general websites. Superfoods were also preliminarily coded for in the full sample. All ingredients listed from these sources were then combined and separated into ingredients for inclusion (if they were unlikely to occur within a beverage they were excluded i.e. salmon). From this, 37 categories were selected: acai, aloe vera, apple cider vinegar, avocado, super berries (blueberries, blackberries, goji berries and elderberry), broccoli, cacao, cherry, chia, chlorophyll, coconut, cranberry, echinacea, freekeh, garlic, ginger, green tea, kale, kefir, kelp, kimichi, kombucha, lupin, maca, matcha, nuts (any e.g. almonds), oats, pea protein, pomegranate, probiotics, protein water, seaweed, seeds (any e.g. chia seed, flaxseed), spinach, spirulina, sweet potato, turmeric, wheatgrass and the overall term "superfood" (or similar terms such as "super fruit" or "super berries").

Appendix G – Study 1 better-for-you features on sugary beverage labels by beverage type (%)*

Better-For-You Categories/Codes	**Alcohol substitute**	**Concentrate**	**Coconut Water, Flavoured**	**Coconut Water, Plain**	**Energy Drink**	**Fruit Drink**	**Iced Tea**	**Juice**	**Juice, 100%**	**Soda**	**Sports Drink**	**Water, Flavoured Mineral**	**Water, Flavoured, Still**
	n=29	n=90	n=25	n=35	n=29	n=91	n=78	n=33	n=293	n=133	n=41	n=50	n=13
Fruit or Vegetables	**93.1**	**86.7**	**100.0**	**100.0**	**48.3**	**100.0**	**98.7**	**100.0**	**100.0**	**66.9**	**68.3**	**96.0**	**92.3**
Fruit/vegetables in text	82.8	83.3	100.0	100.0	44.8	100.0	89.7	100.0	98.3	54.9	65.9	92.0	92.3
Images of fruit/ vegetables	24.1	54.4	88.0	88.6	3.4	73.6	59.0	84.8	78.5	30.1	14.6	90.0	38.5
Superfoods	3.4	10.0	100.0	100.0	10.3	19.8	59.0	45.5	27.0	19.5	14.6	10.0	15.4
Serves or % fruit/ vegetables	13.8	30.0	0.0	0.0	0.0	52.7	3.8	33.3	16.4	6.8	2.4	40.0	15.4
Natural	**65.5**	**58.9**	**96.0**	**94.3**	**13.8**	**89.0**	**100.0**	**87.9**	**91.8**	**61.7**	**24.4**	**62.0**	**61.5**
No artificial products	55.2	53.3	80.0	74.3	6.9	72.5	67.9	60.6	84.3	32.3	24.4	44.0	23.1
Natural	6.9	8.9	96.0	80.0	6.9	31.9	71.8	33.3	29.4	31.6	19.5	20.0	38.5
Pure or raw	0.0	14.4	44.0	57.1	3.4	6.6	33.3	15.2	17.1	8.3	0.0	14.0	15.4
Fresh	31.0	6.7	28.0	14.3	0.0	9.9	12.8	3.0	22.9	3.8	0.0	0.0	0.0
Real	0.0	12.2	4.0	5.7	0.0	26.4	35.9	24.2	5.1	11.3	0.0	18.0	15.4
Organic	0.0	0.0	16.0	22.9	0.0	4.4	47.4	12.1	14.7	6.0	0.0	6.0	0.0
Energy and Sugar Content	**34.5**	**16.7**	**84.0**	**94.3**	**0.0**	**35.2**	**55.1**	**45.5**	**84.6**	**4.5**	**12.2**	**28.0**	**76.9**
No added sugar	31.0	0.0	12.0	62.9	0.0	19.8	16.7	18.2	78.2	0.0	0.0	0.0	0.0
No concentrates	17.2	1.1	60.0	60.0	0.0	4.4	0.0	36.4	40.3	0.0	0.0	0.0	0.0
Naturally sweetened/ sugar from fruit	3.4	10.0	8.0	11.4	0.0	4.4	21.8	0.0	6.5	1.5	7.3	28.0	0.0
Low kilojoules	3.4	2.2	0.0	5.7	0.0	9.9	25.6	0.0	0.0	1.5	0.0	10.0	38.5

No/low fat or cholesterol	0.0	0.0	76.0	60.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low/reduced sugar or % sugar-free	0.0	4.4	12.0	8.6	0.0	5.5	10.3	0.0	0.0	3.8	4.9	0.0	38.5
Unsweetened	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.7	0.0	0.0	0.0	0.0
Nutrition	**3.4**	**7.8**	**60.0**	**60.0**	**17.2**	**36.3**	**41.0**	**42.4**	**31.4**	**15.0**	**68.3**	**2.0**	**30.8**
Listed specific nutrients	3.4	7.8	52.0	57.1	17.2	36.3	38.5	21.2	24.9	15.0	68.3	2.0	30.8
Nutritious or nutritional	0.0	0.0	8.0	8.6	0.0	1.1	3.8	27.3	12.3	0.0	0.0	0.0	0.0
Health	**24.1**	**2.2**	**20.0**	**37.1**	**27.6**	**14.3**	**35.9**	**33.3**	**12.6**	**2.3**	**7.3**	**10.0**	**23.1**
Wellness	24.1	1.1	16.0	20.0	27.6	9.9	12.8	24.2	6.1	0.8	2.4	10.0	23.1
Health/healthy	0.0	1.1	16.0	28.6	0.0	5.5	32.1	6.1	6.8	0.0	0.0	0.0	0.0
Health effects	0.0	0.0	0.0	5.7	0.0	5.5	12.8	18.2	1.4	1.5	4.9	0.0	0.0
Goodness	**0.0**	**2.2**	**12.0**	**17.1**	**0.0**	**5.5**	**30.8**	**60.6**	**22.2**	**0.8**	**0.0**	**24.0**	**7.7**
Dietary Restrictions	**3.4**	**20.0**	**60.0**	**37.1**	**3.4**	**9.9**	**43.6**	**24.2**	**3.1**	**3.0**	**19.5**	**6.0**	**0.0**
Gluten free	3.4	20.0	40.0	34.3	3.4	4.4	37.2	21.2	1.0	1.5	19.5	6.0	0.0
Vegetarian or vegan	0.0	0.0	32.0	8.6	3.4	5.5	30.8	6.1	1.0	1.5	7.3	0.0	0.0
Dairy/lactose free	0.0	0.0	44.0	5.7	3.4	0.0	7.7	3.0	1.7	0.0	0.0	0.0	0.0
Sport	**0.0**	**0.0**	**88.0**	**77.1**	**24.1**	**0.0**	**5.1**	**0.0**	**1.0**	**0.0**	**100.0**	**0.0**	**0.0**
Hydration or rehydrate	0.0	0.0	68.0	68.6	0.0	0.0	5.1	0.0	0.7	0.0	78.0	0.0	0.0
Electrolytes	0.0	0.0	52.0	45.7	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Sport or exercise	0.0	0.0	24.0	8.6	24.1	0.0	0.0	0.0	0.7	0.0	100.0	0.0	0.0
Isotonic or hypotonic	0.0	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	46.3	0.0	0.0
Performance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	26.8	0.0	0.0

Note: n=5 beverages missing from data table from beverage category 'Other'.

*Expressed as percent of beverage labels within a beverage type displaying better-for-you categories and codes

Appendix H – Study 3 ethics approval

H.1 Original ethics approval

THE UNIVERSITY of ADELAIDE

RESEARCH SERVICES
OFFICE OF RESEARCH ETHICS, COMPLIANCE AND INTEGRITY
THE UNIVERSITY OF ADELAIDE

LEVEL 4, RUNDLE MALL PLAZA
50 RUNDLE MALL
ADELAIDE SA 5000 AUSTRALIA

TELEPHONE +61 8 8313 5137
FACSIMILE +61 8 8313 3700
EMAIL hrec@adelaide.edu.au

CRICOS Provider Number 00123M

Our reference 32844

04 April 2018

Associate Professor Caroline Miller
Public Health

Dear Associate Professor Miller

ETHICS APPROVAL No: H-2018-057
PROJECT TITLE: Young adults' perceptions of sugary beverages marketed as healthy, or as 'better-for-you'.

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Health and Medical Sciences) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants.

You are authorised to commence your research on: 04/04/2018
The ethics expiry date for this project is: 30/04/2021

NAMED INVESTIGATORS:

Chief Investigator:	Associate Professor Caroline Miller
Student - Postgraduate Doctorate by Research (PhD):	Miss Aimee Lee Brownbill
Associate Investigator:	Professor Annette Braunack-Mayer

CONDITIONS OF APPROVAL: Thank you for the detailed response and revised application dated 22 March 2018.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled Annual Report on Project Status is to be used when reporting annual progress and project completion and can be downloaded at http://www.adelaide.edu.au/research-services/oreci/human/reporting/. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the information sheet and the signed consent form to retain. It is also a condition of approval that you immediately report anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol or project investigators; and
- the project is discontinued before the expected date of completion.

Yours sincerely,

Ms Sabine Schreiber
Secretary

The University of Adelaide

H.2 Amended ethics approval

THE UNIVERSITY of ADELAIDE

RESEARCH SERVICES
OFFICE OF RESEARCH ETHICS, COMPLIANCE AND INTEGRITY
THE UNIVERSITY OF ADELAIDE

LEVEL 4, RUNDLE MALL PLAZA
50 RUNDLE MALL
ADELAIDE SA 5000 AUSTRALIA

TELEPHONE +61 8 8313 5137
FACSIMILE +61 8 8313 3700
EMAIL hrec@adelaide.edu.au

CRICOS Provider Number 00123M

Our reference 32844

21 November 2018

Associate Professor Caroline Miller
Public Health

Dear Associate Professor Miller

ETHICS APPROVAL No: H-2018-057
PROJECT TITLE: Young adults' perceptions of sugary beverages marketed as healthy, or as 'better-for-you'.

The amendment request to recruit students via email and face-to-face distribution of fliers is approved.

The ethics amendment for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Health and Medical Sciences) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants.

You are authorised to commence your research on: 04/04/2018
The ethics expiry date for this project is: 30/04/2021

NAMED INVESTIGATORS:

Chief Investigator:	Associate Professor Caroline Miller
Student - Postgraduate Doctorate by Research (PhD):	Miss Aimee Lee Brownbill
Associate Investigator:	Professor Annette Braunack-Mayer

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled Annual Report on Project Status is to be used when reporting annual progress and project completion and can be downloaded at http://www.adelaide.edu.au/research-services/oreci/human/reporting/. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the information sheet and the signed consent form to retain. It is also a condition of approval that you immediately report anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol or project investigators; and
- the project is discontinued before the expected date of completion.

Yours sincerely,

Ms Sabine Schreiber
Secretary

The University of Adelaide

Appendix I – Study 3 participant information pack

I.1 Study flyer

WHAT DO YOU THINK ABOUT THE BEVERAGES YOU DRINK?

We are exploring what young adults (18-25) think about different non-alcoholic drinks. We are seeking volunteers to participate in a focus group on this topic.

What will I do?

During the focus group (small group discussion), you will be asked about your thoughts on different drinks and why you drink them. The focus group will be located on campus and will take roughly 60 minutes. You will receive a $20 Coles Myer gift card to thank you for your time.

Why should I participate?

This project is being conducted by a research student at the University of Adelaide as part of their PhD degree; participating is a great way to support a fellow student! You will also have the chance to take a break during your day to have a fun discussion with other students.

How do I sign up?

If you are interested, please contact Aimee Brownbill for more information
Aimee Brownbill | The University of Adelaide | 8313 1689 | Aimee.Brownbill@adelaide.edu.au

This study has approval from the University of Adelaide Human Research Ethics Committee, Approval number H-2018-057

What do you think about the beverages you drink?
Aimee Brownbill | 8313 1689
Aimee.Brownbill@adelaide.edu.au

PARTICIPANT INFORMATION SHEET

PROJECT TITLE: Young adults' perceptions of sugary beverages
HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER: H-2018-057
PRINCIPAL INVESTIGATOR: Associate Professor Caroline Miller
STUDENT RESEARCHER: Aimee Brownbill
STUDENT'S DEGREE: PhD

Dear Participant,

You are invited to participate in the research project described below.

What is the project about?
This project is about what young adults think of different non-alcoholic drinks such as soft drinks, sports drinks, vitamin waters, and juices. We aim to develop an understanding about what motivates you to drink the drinks you do.

Who is undertaking the project?
This project is being conducted by Aimee Brownbill as part of her PhD at the University of Adelaide. The project is being supervised by Associate Professor Caroline Miller and Professor Annette Braunack-Mayer. The project is being funded by the University of Adelaide's School of Public Health and a Commonwealth Government postgraduate research scholarship.

Why am I being invited to participate?
You are being asked to participate as a young adult 18 to 25 years of age. You are able to participate if you are within this age group and if you are able to speak in English for the purpose of a group discussion.

What will I be asked to do?
We will ask that you join a focus group session held at [Insert institution]. A focus group is when a small group of people meet to discuss a specific topic. The group will have 4 to 8 participants of the same gender and will run for approximately 60 minutes. During the focus group we will ask you about your thoughts on different drinks and why you choose to drink different drinks. We will also have different drinks for you to look at and discuss. We will video and audio record the group discussions to help with reviewing the discussion. After the project is finished, you will have the option to receive a copy of the results.

How much time will the project take?
The group discussion will run for 60 minutes. To thank you for your time and contribution you will receive a $20 Coles Myer gift card.

Are there any risks associated with participating in this project?
While it is not likely, you may have some negative feelings if sensitive topics are discussed such as weight or body image. Counsellors at [Insert institution] will be available to you if you have negative

feelings from these group discussions. If any unexpected injuries or events happen during the session, campus staff and security will be notified.

What are the benefits of the research project?
You will not receive any personal benefits from participating in this project. The project aims to be beneficial at a population level through helping to inform future public health interventions and policies.

Can I withdraw from the project?
Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study prior to the completion of the focus groups. Withdrawing from this study will not affect your study at [Insert institution] now or in the future. Once you have participated in the focus group, you cannot withdraw your data from the study.

What will happen to my information?
Data will be securely stored for 5 years after the completion of the project within the School of Public Health at the University of Adelaide. Your personal details such as name and email address will only be available to the researchers listed on this form. The findings from this study will be published in an academic journal, PhD thesis and may also be presented at conferences or seminars. You will not be able to be identified from the reporting of the study findings as any quotations will use pseudonyms (fake names). A copy of the published research can be sent to you at your request.

Who do I contact if I have questions about the project?
If you would like to ask any questions about this project, or you would like us to explain these details to you, please contact Aimee Brownbill. You may choose to have a family member or friend present when we explain these details.

Ms Aimee Brownbill
Research Student
The University of Adelaide
+61 8 8313 1689
Aimee.brownbill@adelaide.edu.au

Associate Professor Caroline Miller
Principal Investigator/ supervisor
The University of Adelaide
+61 8 8128 4091
Caroline.miller@adelaide.edu.au

Professor Annette Braunack-Mayer
Supervisor
The University of Adelaide
+61 8 8313 1694
Annette.braunackmayer@adelaide.edu.au

What if I have a complaint or any concerns?
The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2018-057). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. If you wish to speak with an independent

person regarding a concern or complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the Human Research Ethics Committee's Secretariat on:

Phone: +61 8 8313 6028
Email: hrec@adelaide.edu.au
Post: Level 4, Rundle Mall Plaza, 50 Rundle Mall, ADELAIDE SA 5000

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?
If you would like to participate you can confirm your intent to participate and session time and location when you are contacted by a project researcher. On arrival to the focus group session, you will be asked to read and sign a consent form which is required to participate.

Yours sincerely,
Ms Aimee Brownbill
Associate Professor Caroline Miller
Professor Annette Braunack-Mayer

I.3 Participant consent form

Human Research Ethics Committee (HREC)

CONSENT FORM

1. I have read the attached Information Sheet and agree to take part in the following research project:

Title:	Young adults' perceptions of sugary beverages
Ethics Approval Number:	**H-2018-057**

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

3. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.

4. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.

5. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

6. I understand that I am free to withdraw from the project at any time and that this will not affect my study at the [Insert institution] now or in the future.

7. I agree to the focus group being audio and video recorded. Yes ☐ No ☐

8. I agree that I am aged 18 years or above.

9. I am aware that I should keep a copy of this Consent Form, when completed, and the attached Information Sheet.

Participant to complete:

Name: _____ Signature: _____ Date: _____

Researcher/Witness to complete:

I have described the nature of the research to_____

(print name of participant)

and in my opinion she/he understood the explanation.

Signature: _____ Position: _____ Date: _____

Appendix J – Study 3 focus group guide

Explanation to participants

- Welcome participants and thank them for their time and contribution.
- Introduce group moderator and assistant.
- Confirm all have received and understand the participant information sheet.
- Today we are going to talk about your thoughts on different drinks. I am really interested to hear what you think and about your personal experiences on the topics we discuss rather than expressing my own opinion. It is not a test, there are no wrong or right answers, and it is really important that you provide us with your honest opinions and experiences. Not everyone will think the same things or have the same experiences, and that is ok – I really want to hear the range of thoughts you have. I do just ask that you try to speak one at a time so that we are being respectful to each other and also this will help me be able to keep track of the conversation.
- The group will go for an hour and we would like to audio and video record the group. These recordings will help us to transcribe the session. Any personal details such as your name will be kept confidential and we won't use them in the reporting of the research. Is it ok for us to record the group?
- Are there any questions about the group before we begin? Can I ask that if you haven't, you sign the consent form and pass that one down and I will also ask that you ensure your phones are away and on silent?

Introductions

I'd like to start by asking you to introduce yourself to the group and tell us a bit about yourself: your first name, your age, and what you are studying.

Setting the scene/ sugar containing beverages consumption

Today we will be talking about non-alcoholic drinks. What I would like to do first is get a bit of a sense of what beverages everyone drinks. So, X is going to keep a list for us to refer to and I want you to name the drinks that you drink.

- What about during meal times – is there anything you drink then?
- What about on the weekend?

So looking at the different drinks you have listed here, can you tell me about why you chose these drinks?

- Why do you choose to drink X at X time?
- Why do you choose X over other drinks?
- Why don't you drink X?

Perceptions on the healthfulness of beverages and evaluation by packaging and BFY Claims

I have brought along some examples of different drinks today for us to have a look at and chat about. We are going to put them on the table and you are welcome to have a look at them if they are something you are not familiar with.

- Are you familiar with these? Are they the kind of drinks that you would normally drink?
    - Why do you drink these drinks?
    - Why don't you drink these drinks?
    - Are there any you aren't familiar with? What do you think about them?

Healthfulness ranking activity

What I would like you to do is to rank how healthy you think these drinks are. So, just on your own for this one, on your sheet list the drinks from the least healthy (a rating of 1) to the healthiest (a rating of 8). Again, this is not a test, there are no right or wrong answers. If you need to look at a drink you are welcome to pick it up.

- What drink did you put as number 1 for the least healthy?
    - Why was this one the least healthy?
    - Did anyone rank something different as the least healthy?
- What drink did you put as number 8 for the healthiest?
    - Why was this one the healthiest?
    - Did anyone rank something different as the healthiest?
        - How does 100% juice (or other drinks) compare to water?
- What about the drinks you put in between - when you were ranking the drinks, how did you decide on the order?
    - Is this something you would normally consider when choosing a drink?

Evaluation of beverages by packaging and better-for-you features

I have few more examples for us to have a look at. Ill quickly pass this one around. What do you think about this drink, how would it fit in to your ranking?

- (Refer to BFY features that have not already been mentioned – sugar, HSR) What do you think this means?
    - Why?
    - Does it matter?
- If you were to see a new drink in the shop, how would you decide if it is healthy or not?

Perceptions of healthy

Today we have been speaking about what you drink and how you might evaluate whether a drink is healthy or not. I would like to finish by talking about health more generally.

- How would you define what being healthy means to you?
- What are some examples of a healthy life?
- What about unhealthy?

End group

Appendix K – Study 3 supplementary data table

Participants' (n=32) individual ranking of beverages from least healthy (number 1) to most healthy (number 8), by focus group.

	Soft drink	Energy drink	Juice, 100%	Sports drink	Iced tea	Coconut water	Kombucha	Water
Mean ranking	1.9	1.5	4.6	3.3	4.4	6.6	5.8	7.7
Range score	1-4	1-4	2-8	1-6	2-6	5-7	2-8	4-8
F, Uni, FG 1								
Courtney	1	2	7	3	4	5	6	8
Hannah	2	1	3	4	6	7	5	8
Megan	1	2	5	3	6	7	4	8
Samantha	2	1	8	3	4	6	7	5
Kayla	3	1	5	2	4	7	6	8
Lauren	1	2	5	3	4	7	6	8
Ashley	3	2	4	1	5	6	7	8
F, Uni, FG 2								
Rachel	1	3	4	2	5	6	7	8
Stephanie	2	1	4	5	3	7	6	8
Madison	3	1	5	2	4	6	7	8
Kelsey*	1	NS	2,7	NS	5	6	NS	8
Renee	2	1	6	3	4	7	5	8
F, TAFE, FG 5								
Shelby	1	2	6	3	4	7	5	8
Victoria	1	2	4	3	5	7	6	8
Amanda	2	1	4	5	3	7	6	8
F, TAFE, FG 7								
Alexis	2	1	4	3	5	7	8	6
Melissa	1	4	2	3	5	7	6	8
M, Uni, FG 3								
Brandon	3	1	4	2	6	5	7	8
Andrew	1	2	3	4	4	7	6	8
Ryan	4	1	7	3	2	6	5	8
Michael	1	2	6	3	4	7	5	8
Hunter	3	1	6	2	5	7	4	8
Isaac	2	1	7	3	5	6	8	4
M, Uni, FG 4								
Aaron	4	3	7	1	5	6	2	8
Robert	1	2	4	3	5	6	7	8
Chris	2	1	4	5	3	7	6	8
Kyle	2	1	3	6	4	7	5	8
Logan	1	2	4	5	3	7	6	8
M, TAFE, FG 6								
Matt	2	1	3	5	4	7	6	8
Jacob	2	1	3	5	4	7	6	8
Sam	2	1	3	4	5	7	6	8
Brian	2	1	4	3	6	7	5	8

*Participant did not complete the form. No score (NS) is indicated where beverage was not listed on form. Juice was listed twice with "industrial juice (use essences and sugar)" listed as number 2 and "Juice (really)" listed as number 7. Note: Pseudonyms have been used.

Appendix L – Study 3 beverage prompts

L.1 Beverage set one: Beverage prompts for healthfulness ranking activity and general discussion

Beverage: Soft drink (Soda)
Package size: 600ml
Sugar content: 64g per package
Caffeine: 'contains caffeine' statement declared on label; amount not specified

Beverage: Energy drink
Package size: 250ml
Sugar content: 27g per package

Caffeine: 'contains caffeine' statement declared on label; 78mg per package

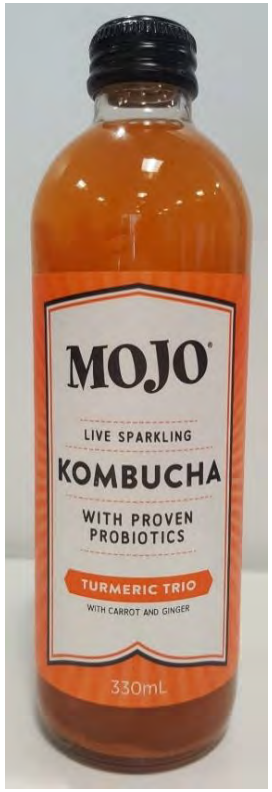
Beverage: Juice, 100%
Package size: 500ml
Sugar content: 41g per package
Caffeine: none declared on label

Beverage: Sports drink
Package size: 600ml
Sugar content: 35g per package
Caffeine content: none declared on label

Beverage: Iced tea
Package size: 500ml
Sugar content: 28g per package
Caffeine content: none declared on label

Beverage: Coconut water
Package size: 330ml
Sugar content: 11g per package

Caffeine content: none declared on label



Beverage: Kombucha
Package size: 330ml
Sugar content: 10g per package
Caffeine content: none declared on label

Beverage: Water
Package size: 600ml
Sugar content: 0g per package

Caffeine content: none declared on label

L.2 Beverage set two: Novel beverage prompts for further discussion

Beverage: V Pure (energy drink)

Package size: 275ml
Sugar content: 18g per package
Beverage: V Pure (energy drink)

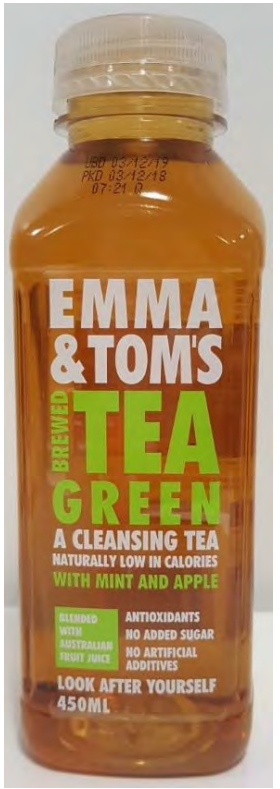
Beverage: Red Bull Organics Lemonade,
(soft drink/soda; non-cola)
Package size: 250ml
Sugar content: 22g per package

Beverage: Red Bull Organics Lemonade,
(soft drink/soda; non-cola)

Beverage: Red Bull Organics Cola,
(soft drink/soda; cola)

Package size: 250ml
Sugar content: 22g per package

Beverage: Red Bull Organics Cola,
(soft drink/soda; cola)



Beverage: Emma & Tom's Iced Green Tea (iced tea)

Package size: 450ml
Sugar content: 20g per package
Beverage: Emma & Tom's Iced Green Tea (iced tea)

Beverage: Pump+ (flavoured water)
Package size: 600ml
Sugar content: 17g per package
Caffeine content: none declared on label

References

1. Finucane MM, Stevens GA, Cowan MJ, Danaei G, Lin JK, Paciorek CJ, Singh GM, Gutierrez HR, Lu Y, Bahalim AN, Farzadfar F, Riley LM, Ezzati M. National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9·1 million participants. The Lancet. 2011;377(9765):557-67. doi:10.1016/S0140-6736(10)62037-5

2. World Health Organization. Obesity and overweight: WHO; 2018 [cited 2019 Oct 29]. Available from: http://www.who.int/mediacentre/factsheets/fs311/en

3. Australian Institute of Health and Welfare. Australia's health 2018 Canberra: AIHW; 2018 [cited 2020 Feb 10]. Available from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129548150

4. Australian Bureau of Statistics. National Health Survey: First results, 2017-18. Report No.: 4364.0.55.001. Canberra: ABS; 2018 [cited 2019 May 15]. Available from: https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-18~Main%20Features~Overweight%20and%20obesity~90

5. Australian Institute of Health and Welfare. Impact of overweight and obesity as a risk factor for chronic conditions. Australian Burden of Disease Study series no. 11. Cat. no. BOD 12. Canberra: AIHW, 2017 Contract No.: May 23.

6. Australian Institute of Health and Welfare. Australian Burden of Disease Study 2015: Interactive data on risk factor burden Canberra: AIHW; 2019 [updated 13 June 2019; cited 2020 Feb 10]. Available from: https://pp.aihw.gov.au/reports/burden-of-disease/burden-disease-study-illness-death-2015/contents/table-of-contents

7. Norton L, Harrison JE, Pointer S, Lathlean T. Obesity and injury in Australia: a review of the literature [Internet]. Canberra: Australian Institute of Health and Welfare; 2011 [cited 2015 Apr 1]. Available from: http://www.aihw.gov.au/publication-detail/?id=10737420420

8. Smeerdijk J, Jovic M, Hutchins D, Petre T, Lee J. Weighing the cost of obesity: a case for action. Price Waterhouse Coopers, 2015 Oct. p. 134.

9. World Health Organization. Noncommunicable diseases: campaign for action - meeting the NCD targets: WHO; 2014 [cited 2019 Dec 10]. Available from: https://www.who.int/beat-ncds/take-action/targets/en

10. Australian Institute of Health and Welfare. Australia's health 2014. Canberra: AIHW; 2014 [cited 2018 May 23]. Available from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129548150

11. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. Nutr Rev. 2012;70(1):3-21. doi:10.1111/j.1753-4887.2011.00456.x

12. Malik VS, Willett WC, Hu FB. Global obesity: trends, risk factors and policy implications. Nat Rev Endocrinol. 2013;9(1):13-27. doi:10.1038/nrendo.2012.199

13. Cohen DA. Obesity and the built environment: changes in environmental cues cause energy imbalances. Int J Obes. 2008;32 Suppl 7:S137-42. doi:10.1038/ijo.2008.250

14. World Health Organization. Guideline: sugar intake for adults and children Geneva: WHO; 2015 [cited 2017 Oct 10]. Available from: http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf?ua=1

15. Australian Bureau of Statistics. Australian Health Survey: consumption of added sugars. Australia 2011-12. Report No.: 4364.0.55.011. Canberra: ABS; 2016 [cited 2019 Apr 16]. Available from: http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/84F8A7C39FBBDDEDCA257FA1002308ED/$File/4364.0.55.011_2011-12.pdf

16. Gupta A, Smithers LG, Braunack-Mayer A, Harford J. How much free sugar do Australians consume? Findings from a national survey. Aust N Z J Public Health. 2018;42(6):533-40. doi:10.1111/1753-6405.12836

17. Louie JCY, Rangan AM. Patterns of added sugars intake by eating occasion among a nationally representative sample of Australians. Eur J Nutr. 2018;57(1):137-54. doi:10.1007/s00394-016-1303-0

18. Lei L, Rangan A, Flood VM, Louie JCY. Dietary intake and food sources of added sugar in the Australian population. Br J Nutr. 2016;115(5):868-77. doi:10.1017/S0007114515005255

19. Woodward-Lopez G, Kao J, Ritchie L. To what extent have sweetened beverages contributed to the obesity epidemic? Public Health Nutr. 2011;14(3):499-509. doi:10.1017/S1368980010002375

20. Bleich SN, Wang YC, Wang Y, Gortmaker SL. Increasing consumption of sugar-sweetened beverages among US adults: 1988-1994 to 1999-2004. Am J Clin Nutr. 2009;89(1):372-81. doi:10.3945/ajcn.2008.26883

21. Duffey K, Popkin B. Shifts in patterns and consumption of beverages between 1965 and 2002. Obesity. 2007;15(11):2739-47. doi:10.1038/oby.2007.326

22. Han E, Powell LM. Consumption patterns of sugar-sweetened beverages in the United States. J Acad Nutr Diet. 2013;113(1):43-53. doi:10.1016/j.jand.2012.09.016

23. Ng SW, Ni Mhurchu C, Jebb SA, Popkin BM. Patterns and trends of beverage consumption among children and adults in Great Britain, 1986-2009. Br J Nutr. 2012;108(3):536-51. doi:10.1017/s0007114511006465

24. Reedy J, Krebs-Smith SM. Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. J Am Diet Assoc. 2010;110(10):1477-84. doi:10.1016/j.jada.2010.07.010

25. Tasevska N, DeLia D, Lorts C, Yedidia M, Ohri-Vachaspati P. Determinants of Sugar-Sweetened Beverage Consumption among Low-Income Children: Are There Differences by Race/Ethnicity, Age, and Sex? Journal of the Academy of Nutrition and Dietetics. 2017. doi:10.1016/j.jand.2017.03.013

26. Cancer Council Victoria. Rethink sugary drink: facts 2016 [cited 2018 Jul 19]. Available from: http://www.rethinksugarydrink.org.au/facts

27. Grimes CA, Riddell LJ, Campbell KJ, Nowson CA. Dietary salt intake, sugar-sweetened beverage consumption, and obesity risk. Pediatrics. 2013;131(1):14-21. doi:10.1542/peds.2012-1628

28. Hafekost K, Mitrou F, Lawrence D, Zubrick SR. Sugar sweetened beverage consumption by Australian children: implications for public health strategy. BMC Public Health. 2011;11:950. doi:10.1186/1471-2458-11-950

29. Clifton PM, Chan L, Moss CL, Miller MD, Cobiac L. Beverage intake and obesity in Australian children. Nutr Metab. 2011;8:87. doi:10.1186/1743-7075-8-87

30. Cockburn N, Lalloo R, Schubert L, Ford PJ. Beverage consumption in Australian children. Eur J Clin Nutr. 2018;72(3):401-9. doi:10.1038/s41430-017-0021-x

31. Elfassy T, Adjoian T, Lent M. Sugary drink consumption among NYC children, youth, and adults: disparities persist over time, 2007-2015. J Community Health. 2018;44:297–306. doi:10.1007/s10900-018-0587-9

32. Lundeen EA, Park S, Pan L, Blanck HM. Daily intake of sugar-sweetened beverages among US adults in 9 states, by state and sociodemographic and behavioral characteristics, 2016. Prev Chronic Dis. 2018;15:180335. doi:10.5888/pcd15.180335

33. Bleich SN, Vercammen KA, Koma JW, Li Z. Trends in beverage consumption among children and adults, 2003-2014. Obesity. 2018;26(2):432-41. doi:10.1002/oby.22056

34. Ozen AE, Bibiloni MDM, Bouzas C, Pons A, Tur JA. Beverage consumption among adults in the Balearic Islands: association with total water and energy intake. Nutrients. 2018;10(9):1149. doi:10.3390/nu10091149

35. Aburto TC, Poti JM, Popkin BM. Patterns and trends in the intake distribution of manufactured and homemade sugar-sweetened beverages in pre-tax Mexico, 1999-2012. Public Health Nutr. 2018;21(18):3296-306. doi:10.1017/s1368980018002677

36. DeBoer MD, Scharf RJ, Demmer RT. Sugar-sweetened beverages and weight gain in 2- to 5-year-old children. Pediatrics. 2013;132(3):413-20. doi:10.1542/peds.2013-0570

37. Hu FB, Malik VS. Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence. Physiol Behav. 2010;100(1):47-54. doi:10.1016/j.physbeh.2010.01.036

38. Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. Am J Clin Nutr. 2006;84(2):274-88

39. Perez-Morales E, Bacardi-Gascon M, Jimenez-Cruz A. Sugar-sweetened beverage intake before 6 years of age and weight or BMI status among older children; systematic review of prospective studies. Nutr Hosp. 2013;28(1):47-51. doi:10.3305/nh.2013.28.1.6247

40. de Ruyter JC, Olthof MR, Seidell JC, Katan MB. A trial of sugar-free or sugar-sweetened beverages and body weight in children. N Engl J Med. 2012;367(15):1397-406. doi:10.1056/NEJMoa1203034

41. Dubois L, Farmer A, Girard M, Peterson K. Regular sugar-sweetened beverage consumption between meals increases risk of overweight among preschool-aged children. J Am Diet Assoc. 2007;107(6):924-34. doi:10.1016/j.jada.2007.03.004

42. Malik VS, Pan A, Willett WC, Hu FB. Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. Am J Clin Nutr. 2013;98(4):1084-102. doi:10.3945/ajcn.113.058362

43. Te Morenga L, Mallard S, Mann J. Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies. BMJ. 2013;346:e7492. doi:10.1136/bmj.e7492

44. Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. Am J Clin Nutr. 2006;84(2):274-88. doi:10.1093/ajcn/84.2.274

45. Malik VS. Sugar sweetened beverages and cardiometabolic health. Curr Opin Cardiol. 2017;32(5):572-9. doi:10.1097/hco.0000000000000439

46. Millar L, Rowland B, Nichols M, Swinburn B, Bennett C, Skouteris H, Allender S. Relationship between raised BMI and sugar sweetened beverage and high fat food consumption among children. Obesity. 2014;22(5):e96-103. doi:10.1002/oby.20665

47. Malik VS, Popkin BM, Bray GA, Despres JP, Willett WC, Hu FB. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: a meta-analysis. Diabetes Care. 2010;33(11):2477-83. doi:10.2337/dc10-1079

48. Imamura F, O'Connor L, Ye Z, Mursu J, Hayashino Y, Bhupathiraju SN, Forouhi NG. Consumption of sugar sweetened beverages, artificially sweetened beverages, and

fruit juice and incidence of type 2 diabetes: systematic review, meta-analysis, and estimation of population attributable fraction. Br J Sports Med. 2016;50(8):496-504. doi:10.1136/bjsports-2016-h3576rep

49. Narain A, Kwok CS, Mamas MA. Soft drink intake and the risk of metabolic syndrome: a systematic review and meta-analysis. Int J Clin Pract. 2017;71(2):e12927. doi:10.1111/ijcp.12927

50. Bernabe E, Vehkalahti MM, Sheiham A, Aromaa A, Suominen AL. Sugar-sweetened beverages and dental caries in adults: A 4-year prospective study. J Dent. 2014;42(8):952-8. doi:10.1016/j.jdent.2014.04.011

51. Jain P, Gary JJ. Which is a stronger indicator of dental caries: oral hygiene, food, or beverage? A clinical study. Gen Dent. 2014;62(3):63-8

52. Malik VS, Popkin BM, Bray GA, Despres JP, Hu FB. Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. Circulation. 2010;121(11):1356-64. doi:10.1161/circulationaha.109.876185

53. Malik VS. Sugar sweetened beverages and cardiometabolic health. Curr Opin Cardiol. 2017;32(5):572-9. doi:10.1097/hco.0000000000000439

54. Arsenault BJ, Lamarche B, Després JP. Targeting overconsumption of sugar-sweetened beverages vs. Overall poor diet quality for cardiometabolic diseases risk prevention: Place your bets! Nutrients. 2017;9(6). doi:10.3390/nu9060600

55. Singh GM, Micha R, Khatibzadeh S, Lim S, Ezzati M, Mozaffarian D. Estimated global, regional, and national disease burdens related to sugar-sweetened beverage consumption in 2010. Circulation. 2015;132(8):639-66. doi:10.1161/CIRCULATIONAHA.114.010636.

56. Hu FB. Resolved: there is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity-related diseases. Obes Rev. 2013;14(8):606-19. doi:10.1111/obr.12040

57. Speers SE, Harris JL, Schwartz MB. Child and adolescent exposure to food and beverage brand appearances during prime-time television programming. Am J Prev Med. 2011;41(3):291-6. doi:10.1016/j.amepre.2011.04.018

58. Visram S, Crossley SJ, Cheetham M, Lake A. Children and young people's perceptions of energy drinks: a qualitative study. PLoS One. 2017;12(11):e0188668. doi:10.1371/journal.pone.0188668

59. Emond JA, Smith ME, Mathur SJ, Sargent JD, Gilbert-Diamond D. Children's food and beverage promotion on television to parents. Pediatrics. 2015;136(6):1095-102. doi:10.1542/peds.2015-2853

60. Freeman B, Kelly B, Baur L, Chapman K, Chapman S, Gill T, King L. Digital junk: food and beverage marketing on Facebook. Am J Public Health. 2014;104(12):56-64. doi:10.2105/AJPH.2014.302167

61. Boelsen-Robinson T, Backholer K, Peeters A. Digital marketing of unhealthy foods to Australian children and adolescents. Health Promot Int. 2016;31(3):523-33. doi:10.1093/heapro/dav008

62. Scully P, Reid O, Macken A, Healy M, Saunders J, Leddin D, Cullen W, Dunne C, O'Gorman CS. Food and beverage cues in children's television programmes: the influence of programme genre. Public Health Nutr. 2016;19(4):616-24. doi:10.1017/s1368980015001755

63. Brownbill AL, Miller CL, Braunack-Mayer AJ. The marketing of sugar-sweetened beverages to young people on Facebook. Aust N Z J Public Health. 2018;42(4):354-60. doi:10.1111/1753-6405.12801

64. Sutherland LA, Mackenzie T, Purvis LA, Dalton M. Prevalence of food and beverage brands in movies: 1996-2005. Pediatrics. 2010;125(3):468-74. doi:10.1542/peds.2009-0857

65. Elsey JW, Harris JL. Trends in food and beverage television brand appearances viewed by children and adolescents from 2009 to 2014 in the USA. Public Health Nutr. 2016;19(11):1928-33. doi:10.1017/s1368980015003274

66. Costa BM, Hayley A, Miller P. Young adolescents' perceptions, patterns, and contexts of energy drink use: a focus group study. Appetite. 2014;80(1):183-9. doi:10.1016/j.appet.2014.05.013

67. Probart C, McDonnell E, Bailey-Davis L, Weirich JE. Existence and predictors of soft drink advertisements in Pennsylvania high schools. J Am Diet Assoc. 2006;106(12):2052-6. doi:10.1016/j.jada.2006.09.013

68. Vandevijvere S, Molloy J, Hassen de Medeiros N, Swinburn B. Unhealthy food marketing around New Zealand schools: a national study. Int J Public Health. 2018;63(9):1099-107. doi:10.1007/s00038-018-1158-7

69. Chacon V, Letona P, Villamor E, Barnoya J. Snack food advertising in stores around public schools in Guatemala. Crit Public Health. 2015;25(3):291-8. doi:10.1080/09581596.2014.953035

70. Barquera S, Hernandez-Barrera L, Rothenberg SJ, Cifuentes E. The obesogenic environment around elementary schools: Food and beverage marketing to children in two Mexican cities. BMC Public Health. 2018;18(1):461-70. doi:10.1186/s12889-018-5374-0

71. Sainsbury E, Colagiuri S, Magnusson R. An audit of food and beverage advertising on the Sydney metropolitan train network: regulation and policy implications. BMC Public Health. 2017;17(1):490. doi:10.1186/s12889-017-4433-2

72. Lucan SC, Maroko AR, Sanon OC, Schechter CB. Unhealthful food-and-beverage advertising in subway stations: targeted marketing, vulnerable groups, dietary intake, and poor health. J Urban Health. 2017;94(2):220-32. doi:10.1007/s11524-016-0127-9

73. Hammond D, Reid JL. Exposure and perceptions of marketing for caffeinated energy drinks among young Canadians. Public Health Nutr. 2017:1-8. doi:10.1017/s1368980017002890

74. Hennessy M, Bleakley A, Piotrowski JT, Mallya G, Jordan A. Sugar-sweetened beverage consumption by adult caregivers and their children: the role of drink features and advertising exposure. Health Educ Behav. 2015;42(5):677-86. doi:10.1177/1090198115577379

75. Kumar G, Onufrak S, Zytnick D, Kingsley B, Park S. Self-reported advertising exposure to sugar-sweetened beverages among US youth. Public Health Nutr. 2015;18(7):1173-9. doi:10.1017/s1368980014001785

76. Potvin Kent M, Pauze E. The frequency and healthfulness of food and beverages advertised on adolescents' preferred web sites in Canada. J Adolesc Health. 2018;63(1):102-7. doi:10.1016/j.jadohealth.2018.01.007

77. Turton P, Piché L, Battram DS. Adolescent attitudes and beliefs regarding caffeine and the consumption of caffeinated beverages. J Nutr Educ Behav. 2016;48(3):181-9.e1. doi:10.1016/j.jneb.2015.12.004

78. Quester P, Pettigrew S, Kopanidis F, Hill SR, Hawkins DI. Consumer behaviour: implications for marketing strategy. 7th ed. New South Wales: McGraw-Hill Education; 2014.

79. Smith R, Kelly B, Yeatman H, Boyland E. Food marketing influences children's attitudes, preferences and consumption: a systematic critical review. Nutrients. 2019;11(4):875. doi:10.3390/nu11040875

80. Boyland EJ, Nolan S, Kelly B, Tudur-Smith C, Jones A, Halford JC, Robinson E. Advertising as a cue to consume: a systematic review and meta-analysis of the effects of acute exposure to unhealthy food and nonalcoholic beverage advertising on intake in children and adults. Am J Clin Nutr. 2016;103(2):519–33. doi:10.3945/ajcn.115.120022

81. Sadeghirad B, Duhaney T, Motaghipisheh S, Campbell NR, Johnston BC. Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. Obes Rev. 2016;17(10):945-59. doi:10.1111/obr.12445

82. Russell SJ, Croker H, Viner RM. The effect of screen advertising on children's dietary intake: a systematic review and meta-analysis. Obes Rev. 2019;20(4):554-68. doi:10.1111/obr.12812

83. Vukmirovic M. The effects of food advertising on food-related behaviours and perceptions in adults: a review. Food Res Int. 2015;75:13-9. doi:10.1016/j.foodres.2015.05.011

84. Battram DS, Piche L, Beynon C, Kurtz J, He M. Sugar-sweetened beverages: Children's perceptions, factors of influence, and suggestions for reducing intake. J Nutr Educ Behav. 2016;48(1):27-34.e1. doi:10.1016/j.jneb.2015.08.015

85. Liu P, Yu Y, King L, Li M. Snack and beverage consumption and preferences in a sample of Chinese children - are they influenced by advertising? Asia Pac J Clin Nutr. 2017;26(6):1125-32. doi:10.6133/apjcn.012017.04

86. Galimov A, Hanewinkel R, Hansen J, Unger JB, Sussman S, Morgenstern M. Energy drink consumption among German adolescents: prevalence, correlates, and predictors of initiation. Appetite. 2019;139:172-9. doi:10.1016/j.appet.2019.04.016

87. Visram S, Cheetham M, Riby DM, Crossley SJ, Lake AA. Consumption of energy drinks by children and young people: a rapid review examining evidence of physical effects and consumer attitudes. BMJ open. 2016;6(10):e010380. doi:10.1136/bmjopen-2015-010380

88. Hattersley L, Irwin M, King L, Allman-Farinelli M. Determinants and patterns of soft drink consumption in young adults: A qualitative analysis. Public Health Nutr. 2009;12(10):1816-22. doi:10.1017/S136898000800462X

89. Francis J, Martin K, Costa B, Christian H, Kaur S, Harray A, Barblett A, Oddy WH, Ambrosini G, Allen K, Trapp G. Informing intervention strategies to reduce energy drink consumption in young people: findings from qualitative research. J Nutr Educ Behav. 2017;49(9):724-33. doi:10.1016/j.jneb.2017.06.007

90. Buchanan L, Kelly B, Yeatman H. Exposure to digital marketing enhances young adults' interest in energy drinks: An exploratory investigation. PLoS One. 2017;12(2):e0171226. doi:10.1371/journal.pone.0171226

91. Koordeman R, Anschutz DJ, van Baaren RB, Engels RC. Exposure to soda commercials affects sugar-sweetened soda consumption in young women: an observational experimental study. Appetite. 2010;54(3):619-22. doi:10.1016/j.appet.2010.03.008

92. Powell LM, Wada R, Khan T, Emery SL. Food and beverage television advertising exposure and youth consumption, body mass index and adiposity outcomes. Can J Econ. 2017;50(2):345-64. doi:10.1111/caje.12261

93. Freudenberg N, Galea S. The impact of corporate practices on health: implications for health policy. J Public Health Policy. 2008;29(1):86-104. doi:10.1057/palgrave.jphp.3200158

94. Roberto CA, Swinburn B, Hawkes C, Huang TTK, Costa SA, Ashe M, Zwicker L, Cawley JH, Brownell KD. Patchy progress on obesity prevention: emerging examples, entrenched barriers, and new thinking. The Lancet. 2015;385(9985):2400-9. doi:10.1016/S0140-6736(14)61744-X

95. Lobstein T, Jackson-Leach R, Moodie ML, Hall KD, Gortmaker SL, Swinburn BA, James WPT, Wang Y, McPherson K. Child and adolescent obesity: part of a bigger picture. The Lancet. 2015;385(9986):2510-20. doi:10.1016/S0140-6736(14)61746-3

96. Hawkes C, Smith TG, Jewell J, Wardle J, Hammond RA, Friel S, Thow AM, Kain J. Smart food policies for obesity prevention. The Lancet. 2015;385(9985):2410-21. doi:10.1016/S0140-6736(14)61745-1

97. Story M, Kaphingst KM, Robinson-O'Brien R, Glanz K. Creating healthy food and eating environments: policy and environmental approaches. Annu Rev Public Health. 2008;29:253-72. doi:10.1146/annurev.publhealth.29.020907.090926

98. World Health Organization. Set of recommendations on the marketing of foods and non-alcoholic beverages to children Geneva: WHO; 2010 [cited 2019 Dec 15]. Available from: https://www.who.int/dietphysicalactivity/publications/recsmarketing/en

99. Moodie R, Daube M, Carnell KAO, Connors C, Larkin S, Roberts LAM, Segal L, Selvey S, Zimmet PAO. Australia: the healthiest country by 2020. Canberra: Australian Government Preventative Health Taskforce, 2009. p. 316.

100. McCarthy EJ. Basic marketing: a managerial approach. Homewood: RD Irwin; 1960.

101. Ipsos. Australia's most comprehensive study integrating consumer attitudinal trends with consumption behaviour change. Annual report 2015-16. 2016 [cited 2019 Nov 2].

Available from: http://ipsos.com.au/wp-content/uploads/2016/05/Food-CHATs-report-abridged.2016.pdf

102. Kerry Proprietary Consumer Research. Sensibly sweet. Formulating for clean label taste. 2018 [cited 2019 Jul 27]. Available from: https://na.kerry.com/thank-you-sensibly-sweet-white-paper

103. Food Standards Agency. Public Attitudes Tracker Survey 2018 [cited 2019 Oct 14]. Available from: https://www.food.gov.uk/news-alerts/news/public-attitudes-tracker-survey-results-published-0

104. Obesity Evidence Hub. Countries that have implemented taxes on sugar-sweetened beverages (SSBs). Melbourne: Cancer Council Victoria; 2019 [cited 2019 Oct 23]. Available from: https://www.obesityevidencehub.org.au/collections/prevention/countries-that-have-implemented-taxes-on-sugar-sweetened-beverages-ssbs

105. Cancer Council Victoria. Rethink sugary drinks 2019 [cited 2020 Feb 10]. Available from: http://www.rethinksugarydrink.org.au

106. Te V, Ford P, Schubert L. Exploring social media campaigns against sugar-sweetened beverage consumption: a systematic search. Cogent Med. 2019;6(1):e1607432. doi:10.1080/2331205X.2019.1607432

107. Donaldson EA, Cohen JE, Truant PL, Rutkow L, Kanarek NF, Barry CL. News media framing of New York City's sugar-sweetened beverage portion-size cap. Am J Public Health. 2015;105(11):2202-9. doi:10.2105/ajph.2015.302673

108. Niederdeppe J, Gollust SE, Jarlenski MP, Nathanson AM, Barry CL. News coverage of sugar-sweetened beverage taxes: pro- and antitax arguments in public discourse. Am J Public Health. 2013;103(6):e92-8. doi:10.2105/ajph.2012.301023

109. Elliott-Green A, Hyseni L, Lloyd-Williams F, Bromley H, Capewell S. Sugar-sweetened beverages coverage in the British media: an analysis of public health advocacy versus pro-industry messaging. BMJ open. 2016;6(7):e011295. doi:10.1136/bmjopen-2016-011295

110. Euromonitor International. Soft drinks in Australia. Sydney, Australia: 2016.

111. Euromonitor International. Carbonates in Australia. Sydney: 2016 Mar.

112. Colby SE, Johnson L, Scheett A, Hoverson B. Nutrition marketing on food labels. J Nutr Educ Behav. 2010;42(2):92-8. doi:10.1016/j.jneb.2008.11.002

113. Williams P, Yeatman H, Ridges L, Houston A, Rafferty J, Ridges A, Roesler L, Sobierajski M, Spratt B. Nutrition function, health and related claims on packaged Australian food products-prevalence and compliance with regulations. Asia Pac J Clin Nutr. 2006;15(1):10-20. doi:10.2254/0964-7058.15.1.0222

114. Hughes C, Wellard L, Lin J, Suen KL, Chapman K. Regulating health claims on food labels using nutrient profiling: what will the proposed standard mean in the Australian supermarket? Public Health Nutr. 2013;16(12):2154-61. doi:10.1017/s136898001200540x

115. Kaur A, Scarborough P, Matthews A, Payne S, Mizdrak A, Rayner M. How many foods in the UK carry health and nutrition claims, and are they healthier than those that do not? Public Health Nutr. 2015;19(6):988-97. doi:10.1017/s1368980015002104

116. Schermel A, Emrich TE, Arcand J, Wong CL, L'Abbe MR. Nutrition marketing on processed food packages in Canada: 2010 Food Label Information Program. Appl Physiol Nutr Metab. 2013;38(6):666-72. doi:10.1139/apnm-2012-0386

117. Williams P, Yeatman H, Zakrzewski S, Aboozaid B, Henshaw S, Ingram K, Rankine A, Walcott S, Ghani F. Nutrition and related claims used on packaged Australian foods--implications for regulation. Asia Pac J Clin Nutr. 2003;12(2):138-50.

118. Mayhew AJ, Lock K, Kelishadi R, Swaminathan S, Marcilio CS, Iqbal R, Dehghan M, Yusuf S, Chow CK. Nutrition labelling, marketing techniques, nutrition claims and health claims on chip and biscuit packages from sixteen countries. Public Health Nutr. 2016;19(6):998-1007. doi:10.1017/s1368980015000658

119. Whalen R, Harrold J, Child S, Halford J, Boyland E. The health halo trend in UK television food advertising viewed by children: the rise of implicit and explicit health

messaging in the promotion of unhealthy foods. Int J Environ Res Public Health. 2018;15(3):560. doi:10.3390/ijerph15030560

120. Choi WJ, Kim HK. Health claims for food products advertised on Korean television and their regulation: a content analysis. J Health Commun. 2011;16(9):925-40. doi:10.1080/10810730.2011.561911

121. Batada A, Seitz MD, Wootan MG, Story M. Nine out of 10 food advertisements shown during saturday morning children's television programming are for foods high in fat, sodium, or added sugars, or low in nutrients. J Am Diet Assoc. 2008;108(4):673-8. doi:10.1016/j.jada.2008.01.015

122. Roberts M, Pettigrew S. A thematic content analysis of children's food advertising. Int J Advert. 2007;26(3):357-67. doi:10.1080/02650487.2007.11073018

123. Jenkin G, Madhvani N, Signal L, Bowers S. A systematic review of persuasive marketing techniques to promote food to children on television. Obes Rev. 2014;15(4):281-93. doi:10.1111/obr.12141

124. Scully P, Reid O, Macken A, Healy M, Saunders J, Leddin D, Cullen W, Dunne C, O'Gorman CS. Food and beverage cues in UK and Irish children-television programming. Arch Dis Child. 2014;99(11):979-84. doi:10.1136/archdischild-2013-305430

125. Prell H, Palmblad E, Lissner L, Berg CM. Health discourse in Swedish television food advertising during children's peak viewing times. Appetite. 2011;56(3):607-16. doi:10.1016/j.appet.2011.01.033

126. Galcheva SV, Iotova VM, Stratev VK. Television food advertising directed towards Bulgarian children. Arch Dis Child. 2008;93(10):857-61. doi:10.1136/adc.2007.134437

127. Correa T, Reyes M, Smith Taillie LP, Dillman Carpentier FR. The prevalence and audience reach of food and beverage advertising on Chilean television according to marketing tactics and nutritional quality of products. Public Health Nutr. 2019;22(6):1113-24. doi:10.1017/s1368980018003130

128. McHiza ZJ, Temple NJ, Steyn NP, Abrahams Z, Clayford M. Content analysis of television food advertisements aimed at adults and children in South Africa. Public Health Nutr. 2013;16(12):2213-20. doi:10.1017/s136898001300205x

129. Royo-Bordonada MA, Bosqued-Estefania MJ, Damian J, Lopez-Jurado L, Moya-Geromini MA. Nutrition and health claims in products directed at children via television in Spain in 2012. Gac Sanit. 2016;30(3):221-6. doi:10.1016/j.gaceta.2016.01.004

130. Abrams KM, Evans C, Duff BR. Ignorance is bliss. How parents of preschool children make sense of front-of-package visuals and claims on food. Appetite. 2015;87:20-9. doi:10.1016/j.appet.2014.12.100

131. Dean M, Lahteenmaki L, Shepherd R. Nutrition communication: consumer perceptions and predicting intentions. Proc Nutr Soc. 2011;70(1):19-25. doi:10.1017/s0029665110003964

132. Williams P. Consumer understanding and use of health claims for foods. Nutr Rev. 2005;63(7):256-64. doi:10.1111/j.1753-4887.2005.tb00382.x

133. Gorton D, Mhurchu CN, Bramley D, Dixon R. Interpretation of two nutrition content claims: a New Zealand survey. Aust N Z J Public Health. 2010;34(1):57-62. doi:10.1111/j.1753-6405.2010.00474.x

134. Oostenbach LH, Slits E, Robinson E, Sacks G. Systematic review of the impact of nutrition claims related to fat, sugar and energy content on food choices and energy intake. BMC Public Health. 2019;19(1):1296. doi:10.1186/s12889-019-7622-3

135. Kaur A, Scarborough P, Rayner M. A systematic review, and meta-analyses, of the impact of health-related claims on dietary choices. Int J Behav Nutr Phys Act. 2017;14(1):93-110. doi:10.1186/s12966-017-0548-1

136. Talati Z, Norman R, Kelly B, Dixon H, Neal B, Miller C, Pettigrew S. A randomized trial assessing the effects of health claims on choice of foods in the presence of front-of-pack labels. Am J Clin Nutr. 2018;108(6):1275-82. doi:10.1093/ajcn/nqy248

137. Steinhauser J, Hamm U. Consumer and product-specific characteristics influencing the effect of nutrition, health and risk reduction claims on preferences and purchase behavior – a systematic review. Appetite. 2018;127:303-23. doi:10.1016/j.appet.2018.05.012

138. Cornish LS. It's good for me: It has added fibre! An exploration of the role of different categories of functional foods in consumer diets. J Consum Behav. 2012;11(4):292-302. doi:10.1002/cb.1388

139. Enax L, Weber B. Marketing placebo effects--from behavioral effects to behavior change? JAFIO. 2015;13(1):15-31. doi:10.1515/jafio-2015-0015

140. Australia New Zealand Food Standards Code - Standard 1.2.7 - Nutrition, health and related claims. Canberra: Federal Register of Legislation, Australian Government; 2016 Mar.

141. Pulker CE, Scott JA, Pollard CM. Ultra-processed family foods in Australia: nutrition claims, health claims and marketing techniques. Public Health Nutr. 2018;21(1):38-48. doi:10.1017/s1368980017001148

142. Ni Mhurchu C, Gorton D. Nutrition labels and claims in New Zealand and Australia: a review of use and understanding. Aust N Z J Public Health. 2007;31(2):105-12. doi:10.1111/j.1753-6405.2007.00026.x

143. Talati Z, Pettigrew S, Neal B, Dixon H, Hughes C, Kelly B, Miller C. Consumers' responses to health claims in the context of other on-pack nutrition information: a systematic review. Nutr Rev. 2017;75(4):260-73. doi:10.1093/nutrit/nuw070

144. Hodgkins EC, Egan B, Peacock M, Klepacz N, Miklavec K, Pravst I, Pohar J, Gracia A, Groeppel-Klein A, Rayner M, Raats MM. Understanding how consumers categorise health related claims on foods: a consumer-derived typology of health-related claims. Nutrients. 2019;11(3):539. doi:10.3390/nu11030539

145. Harris JL, Haraghey KS, Lodolce M, Semenza NL. Teaching children about good health? Halo effects in child-directed advertisements for unhealthy food. Pediatr Obes. 2018;13(4):256-64. doi:10.1111/ijpo.12257

146. Sundar A, Kardes FR. The role of perceived variability and the health halo effect in nutritional inference and consumption. Psychol Mark. 2015;32(5):512-21. doi:10.1002/mar.20796

147. Fernan C, Schuldt JP, Niederdeppe J. Health halo effects from product titles and nutrient content claims in the context of “protein” bars. Health Commun. 2018;33(12):1425-33. doi:10.1080/10410236.2017.1358240

148. Schuldt JP. Does green mean healthy? Nutrition label color affects perceptions of healthfulness. Health Commun. 2013;28(8):814-21. doi:10.1080/10410236.2012.725270

149. Irmak C, Vallen B, Robinson SR. The impact of product name on dieters' and nondieters' food evaluations and consumption. J Consumer Res. 2011;38(2):390-405. doi:10.1086/660044

150. Verrill L, Iles IA, Nan X. Soda or VitaSoda: how product name influences perceptions of snack food healthfulness and the moderating role of nutrition facts labels. Health Commun. 2019:1-8. doi:10.1080/10410236.2019.1598745

151. Sutterlin B, Siegrist M. Simply adding the word "fruit" makes sugar healthier: the misleading effect of symbolic information on the perceived healthiness of food. Appetite. 2015;95:252-61. doi:10.1016/j.appet.2015.07.011

152. van Trijp HC, van der Lans IA. Consumer perceptions of nutrition and health claims. Appetite. 2007;48(3):305-24. doi:10.1016/j.appet.2006.09.011

153. van Kleef E, van Trijp HC, Luning P. Functional foods: health claim-food product compatibility and the impact of health claim framing on consumer evaluation. Appetite. 2005;44(3):299-308. doi:10.1016/j.appet.2005.01.009

154. Munsell CR, Harris JL, Sarda V, Schwartz MB. Parents’ beliefs about the healthfulness of sugary drink options: opportunities to address misperceptions. Public Health Nutr. 2016;19(1):46-54. doi:10.1017/S1368980015000397

155. Franco-Arellano B, Bernstein JT, Norsen S, Schermel A, L'Abbé MR. Assessing nutrition and other claims on food labels: a repeated cross-sectional analysis of the Canadian food supply. BMC Nutrition. 2017;3(1):74. doi:10.1186/s40795-017-0192-9

156. Bernstein JT, Franco-Arellano B, Schermel A, Labonté M-È, L'Abbé MR. Healthfulness and nutritional composition of Canadian prepackaged foods with and without sugar claims. Appl Physiol Nutr Metab. 2017;42(11):1217-24. doi:10.1139/apnm-2017-0169

157. Harris J, Schwartz M, LoDolce M, Munsell C, Fleming-Milici F, Elsey J, Liu S, Hyary M, Gross R, Hazen C, Dembek C. Sugary drink FACTS 2014: Some progress but much room for improvement in marketing to youth. Rudd Center for Food Policy & Obesity, 2014. p. 166.

158. Mediano Stoltze F, Barker JO, Kanter R, Corvalan C, Reyes M, Taillie LS, Dillman Carpentier FR. Prevalence of child-directed and general audience marketing strategies on the front of beverage packaging: the case of Chile. Public Health Nutr. 2018;21(3):454-64. doi:10.1017/s1368980017002671

159. Perry A, Chacon V, Barnoya J. Health claims and product endorsements on child-oriented beverages in Guatemala. Public Health Nutr. 2018;21(3):627-31. doi:10.1017/s1368980017003123

160. Dachner N, Mendelson R, Sacco J, Tarasuk V. An examination of the nutrient content and on-package marketing of novel beverages. Appl Physiol Nutr Metab. 2015;40(2):191-8. doi:10.1139/apnm-2014-0252

161. Bogart LM, Cowgill BO, Sharma AJ, Uyeda K, Sticklor LA, Alijewicz KE, Schuster MA. Parental and home environmental facilitators of sugar-sweetened beverage consumption among overweight and obese Latino youth. Acad Pediatr. 2013;13(4):348-55. doi:10.1016/j.acap.2013.02.009

162. Kim H, House LA. Linking consumer health perceptions to consumption of nonalcoholic beverages. Aust J Agric Resour Econ. 2014;43(1):1-16. doi:10.1017/S1068280500006870

163. Kumar G, Park S, Onufrak S. Perceptions about energy drinks are associated with energy drink intake among U.S. youth. Am J Health Promot. 2015;29(4):238-44. doi:10.4278/ajhp.130820-QUAN-435

164. Zytnick D, Park S, Onufrak SJ, Kingsley BS, Sherry B. Knowledge of sugar content of sports drinks is not associated with sports drink consumption. Am J Health Promot. 2015;30(2):101-8. doi:10.4278/ajhp.130916-QUAN-479

165. Bunting H, Baggett A, Grigor J. Adolescent and young adult perceptions of caffeinated energy drinks: a qualitative approach. Appetite. 2013;65(1):132-8. doi:10.1016/j.appet.2013.02.011

166. Smith M, Jenkin G, Signal L, McLean R. Consuming calories and creating cavities: beverages NZ children associate with sport. Appetite. 2014;81:209-17. doi:10.1016/j.appet.2014.06.015

167. Bucher T, Siegrist M. Children's and parents' health perception of different soft drinks. Br J Nutr. 2015;113(3):526-35. doi:10.1017/s0007114514004073

168. Musaiger A, Zagzoog N. Knowledge, attitudes and practices toward energy drinks among adolescents in Saudi Arabia. Glob J Health Sci. 2013;6(2):42-6. doi:10.5539/gjhs.v6n2p42

169. Ennis K, Holt A, Cheater S. Sugar-sweetened beverages: availability and purchasing behaviour within the school fringe. Int J Health Promot Educ. 2014;52(5):300-12. doi:10.1080/14635240.2014.923286

170. Block JP, Gillman MW, Linakis SK, Goldman RE. "If it tastes good, I'm drinking it": Qualitative study of beverage consumption among college students. J Adolesc Health. 2013;52(6):702-6. doi:10.1016/j.jadohealth.2012.11.017

171. Rampersaud GC, Kim H, Gao Z, House LA. Knowledge, perceptions, and behaviors of adults concerning nonalcoholic beverages suggest some lack of comprehension related to sugars. Nutr Res. 2014;34(2):134-42. doi:10.1016/j.nutres.2013.11.004

172. Eli K, Hornell A, Etminan Malek M, Nowicka P. Water, juice, or soda? Mothers and grandmothers of preschoolers discuss the acceptability and accessibility of beverages. Appetite. 2017;112:133-42. doi:10.1016/j.appet.2017.01.011

173. Fairchild RM, Broughton D, Morgan MZ. Knowledge of and attitudes to sports drinks of adolescents living in South Wales, UK. Br Dent J. 2017;222(12):931-5. doi:10.1038/sj.bdj.2017.542

174. Ha D, Song I, Jang G, Lee EK, Shin JY. Use pattern and predictors of use of highly caffeinated energy drinks among South Korean adolescents: a study using the Health Belief Model. BMJ open. 2017;7(9):e017224. doi:10.1136/bmjopen-2017-017224

175. Ludden AB, O'Brien EM, Pasch KE. Beliefs, behaviors, and contexts of adolescent caffeine use: a focus group study. Subst Use Misuse. 2017;52(9):1207-18. doi:10.1080/10826084.2017.1302957

176. McCrory C, White CM, Bowman C, Fenton N, Reid JL, Hammond D. Perceptions and knowledge of caffeinated energy drinks: results of focus groups with Canadian youth. J Nutr Educ Behav. 2017;49(4):304-11. doi:10.1016/j.jneb.2016.11.013

177. Thomson N, Worsley A, Wang W, Sarmugam R, Pham Q, Februhartanty J. Country context, personal values and nutrition trust: Associations with perceptions of beverage healthiness in five countries in the Asia Pacific region. Food Qual Prefer. 2017;60:123-31. doi:10.1016/j.foodqual.2017.04.003

178. Wiggers D, Reid JL, White CM, Hammond D. Use and perceptions of caffeinated energy drinks and energy shots in Canada. Am J Prev Med. 2017;53(6):866-71. doi:10.1016/j.amepre.2017.05.021

179. Cormier B, Reid JL, Hammond D. Perceptions of caffeinated drinks among youth and young adults in Canada. Health Promot Chronic Dis Prev Can. 2018;38(5):214-8. doi:10.24095/hpcdp.38.5.04

180. Martins A, Ferreira C, Sousa D, Costa S. Consumption patterns of energy drinks in Portuguese adolescents from a city in Northern Portugal. Acta Med Port. 2018;31(4):207-12. doi:10.20344/amp.9403

181. Miller KE, Dermen KH, Lucke JF. Caffeinated energy drink use by U.S. adolescents aged 13-17: A national profile. Psychol Addict Behav. 2018;32(6):647-59. doi:10.1037/adb0000389

182. Moran AJ, Roberto CA. Health warning labels correct parents' misperceptions about sugary drink options. Am J Prev Med. 2018;55(2):e19-e27. doi:10.1016/j.amepre.2018.04.018

183. Thorlton J, Collins WB. Underlying beliefs associated with college student consumption of energy beverages. West J Nurs Res. 2018;40(1):5-19. doi:10.1177/0193945916686961

184. Hess JM, Lilo EA, Cruz TH, Davis SM. Perceptions of water and sugar-sweetened beverage consumption habits among teens, parents and teachers in the rural south-western USA. Public Health Nutr. 2019;22(8):1376-87. doi:10.1017/s1368980019000272

185. Miller C, Braunack-Mayer A, Wakefield M, Roder D, O'Dea K, Dono J, Ettridge K. “When we were young, it really was a treat; now sugar is just the norm every day”—A qualitative study of parents’ and young adults’ perceptions and consumption of sugary drinks. Health Promot J Austr. 2019;31(1):47-57. doi:10.1002/hpja.257

186. Broughton D, Fairchild RM, Morgan MZ. A survey of sports drinks consumption among adolescents. Br Dent J. 2016;220(12):639-43. doi:10.1038/sj.bdj.2016.449

187. Costa BM, Hayley A, Miller P. Adolescent energy drink consumption: an Australian perspective. Appetite. 2016;105:638-42. doi:10.1016/j.appet.2016.07.001

188. Phan UT, Chambers Et. Motivations for choosing various food groups based on individual foods. Appetite. 2016;105:204-11. doi:10.1016/j.appet.2016.05.031

189. Miller C, Wakefield M, Braunack-Mayer A, Roder D, O'Dea K, Ettridge K, Dono J. Who drinks sugar sweetened beverages and juice? An Australian population study of behaviour, awareness and attitudes. BMC Obesity. 2019;6(1):1-12. doi:10.1186/s40608-018-0224-2

190. Lundeen EA, Park S, Onufrak S, Cunningham S, Blanck HM. Adolescent sugar-sweetened beverage intake is associated with parent intake, not knowledge of health risks. Am J Health Promot. 2018;32(8):1661-70. doi:10.1177/0890117118763008

191. Park S, Ayala GX, Sharkey JR, Blanck HM. Knowledge of health conditions associated with sugar-sweetened beverage intake is low among US Hispanic adults. Am J Health Promot. 2019;33(1):39-47. doi:10.1177/0890117118774206

192. Park S, Lundeen Elizabeth A., Pan Liping, Blanck Heidi M. Impact of knowledge of health conditions on sugar-sweetened beverage intake varies among US adults. Am J Health Promot. 2018;32(6):1402-8. doi:10.1177/0890117117717381

193. Gorski PS. What is critical realism? And why should you care? Contemp Sociol. 2013;42(5):658-70. doi:10.1177/0094306113499533

194. Danermark B, Ekstrom M, Jakobsen L, Karlsson JC, Bhaskar PR. Explaining society : an introduction to critical realism in the social sciences. London: Routledge; 2001.

195. Simmonds H, Gazley A. Marketing systems: critical realist interventions towards better theorizing. J Crit Realism. 2018;17(2):140-59. doi:10.1080/14767430.2018.1454684

196. Carson DJ, Gilmore A, Perry C, Gronhaug K. Qualitative marketing research. London: SAGE Publications; 2001.

197. Cruickshank J. Positioning positivism, critical realism and social constructionism in the health sciences: a philisophical orientation. Nurs Inq. 2012;19(1):71-82. doi:10.1111/j.1440-1800.2011.00558.x

198. Burr V. Social constructionism. 3rd ed. London: Routledge; 2015.

199. Crotty M. The foundations of social research. Meaning and perspective in the research process. New South Wales: Allen & Unwin; 1998.

200. Rossman GB, Rallis SF. The researcher as a learner. In: Learning in the field. An introduction to qualitative research 2ed. California: Sage Publications; 2003.

201. Fletcher AJ. Applying critical realism in qualitative research: methodology meets method. Int J Soc Res. 2017;20(2):181-94. doi:10.1080/13645579.2016.1144401

202. Creswell J. Research design. Qualitative, quantitative and mixed methods approaches. 4th ed. London: SAGE; 2014.

203. Meixner C, Hathcoat JD. The nature of mixed methods research. In: Liamputtong P, editor. Handbook of research methods in health social sciences. Singapore: Springer; 2019. p. 51-70.

204. McBride KA, MacMillan F, George ES, Steiner GZ. The use of mixed methods in research. In: Liamputtong P, editor. Handbook of research methods in health social sciences. Singapore: Springer; 2019. p. 695-713.

205. Creswell JW. Designing and conducting mixed methods research. 3rd ed. Plano Clark VL, editor: SAGE; 2018.

206. Leiss W, Kline S, Jhally S. Social communication in advertising. Persons, products & images of well-being. 2nd ed. New York: Routledge; 1990.

207. Chaudhuri A, Buck R. Media differences in rational and emotional responses to advertising. J Broadcast Electron Media. 1995;39(1):109-25. doi:10.1080/08838159509364291

208. Boulton J, Hashem KM, Jenner KH, Lloyd-Williams F, Bromley H, Capewell S. How much sugar is hidden in drinks marketed to children? A survey of fruit juices, juice drinks and smoothies. BMJ open. 2016;6(3):e010330. doi:10.1136/bmjopen-2015-010330

209. Auerbach B, Wolf FM, Hikida A, Vallila-Buchman P, Littman A, Thompson D, Louden D, Taber DR, Krieger J. Fruit juice and change in BMI: A meta-analysis. Pediatriacs. 2017;139(4):e20162454. doi:10.1542/peds.2016-2454

210. Salas MMS, Nascimento GG, Vargas-Ferreira F, Tarquinio SBC, Huysmans MCDNJM, Demarco FF. Diet influenced tooth erosion prevalence in children and adolescents: results of a meta-analysis and meta-regression. J Dent. 2015;43(8):865-75. doi:10.1016/j.jdent.2015.05.012

211. Xi B, Li S, Liu Z, Tian H, Yin X, Huai P, Tang W, Zhou D, Steffen LM. Intake of fruit juice and incidence of type 2 diabetes: a systematic review and meta-analysis. PLoS One. 2014;9(3):e93471. doi:10.1371/journal.pone.0093471

212. Crowe-White K, O'Neil CE, Parrott JS, Benson-Davies S, Droke E, Gutschall M, Stote KS, Wolfram T, Ziegler P. Impact of 100% fruit juice consumption on diet and weight status of children: an evidence-based review. Crit Rev Food Sci Nutr. 2016;56(5):871-84. doi:10.1080/10408398.2015.1061475

213. Popkin BM, Hawkes C. Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. The Lancet. 2016;4(2):174-86. doi:10.1016/s2213-8587(15)00419-2

214. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77-101. doi:10.1191/1478088706qp063oa

215. Wetherell M, Taylor S, Yates S. Discourse as data: a guide for analysis. London: Sage Publications; 2001.

216. Liamputtong P. Rigour and ethics in qualitative research. In: P. Liamputtong, editor. Qualitative research methods. 4th ed. Melbourne: Oxford University Press; 2013. p. 23-46.

217. Braun V, Clarke V, Hayfield N, Terry G. Thematic Analysis. In: Liamputtong P, editor. Handbook of Research Methods in Health Social Sciences. Singapore: Springer; 2019. p. 843-60.

218. Brownbill AL. The marketing of sugar-sweetened beverages to young people on social media. Adelaide: University of Adelaide; 2015.

219. Brownbill AL, Miller CL, Braunack-Mayer AJ. Industry use of 'better-for-you' features on labels of sugar-containing beverages. Public Health Nutr. 2018;21(18):3335-43. doi:10.1017/S1368980018002392

220. Brownbill AL, Braunack-Mayer AJ, Miller CL. Health Star Ratings: What's on the labels of Australian beverages? Health Promot J Austr. 2019;30(1):114-18. doi:10.1002/hpja.197

221. Euromonitor International. Better for you beverages in Australia. Sydney, Australia: 2016.

222. Amplify Snack Brands. Better-for-you snacks: The new snacking reality. 2017 April [cited 2017 Aug 2]. Available from: https://amplifysnackbrands.com/documents/Amplify-2017-Snack-Study.PDF

223. PepsiCo. Explore PeppsiCo brands: better for you [cited 2018 Jul 24]. Available from: www.pepsico.com/Brands/BrandExplorer#better-for-you

224. Obesity Solutions Inititative. Better-for-you foods. It's just good business. Washington: Hudson Institute, October 2011.

225. Campos S, Doxey J, Hammond D. Nutrition labels on pre-packaged foods: a systematic review. Public Health Nutr. 2011;14(8):1496-506. doi:10.1017/s1368980010003290

226. Elliott C. How Canadians communicate VI: food promotion, consumption, and controversy: Edmonton: Athabasca University Press; 2016.

227. Christoforou A, Dachner N, Mendelson R, Tarasuk V. Front-of-package nutrition references are positively associated with food processing. Public Health Nutr. 2018;21(1):58-67. doi:10.1017/S1368980017001057

228. Roy Morgan Research. Supermarket sweep: ALDI's share of the Aussie market still rising. 2016 Apr [cited 2016 Jul 15]. Available from: http://www.roymorgan.com/findings/6762-supermarket-sweep-aldis-share-of-aussie-market-still-rising-201604142258

229. Australian Bureau of Statistics. Census of population and housing: socio-economic indexes for areas (SEIFA), Australia, 2011. Canberra: ABS; 2013 May [cited 2016 Jul 19]. Available from: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2011~Main%20Features~Main%20Page~1

230. Rayner M, Wood A, Lawrence M, Mhurchu CN, Albert J, Barquera S, Friel S, Hawkes C, Kelly B, Kumanyika S, L'Abbe M, Lee A, Lobstein T, Ma J, Macmullan J, Mohan S, Monteiro C, Neal B, Sacks G, Sanders D, Snowdon W, Swinburn B, Vandevijvere S, Walker C. Monitoring the health-related labelling of foods and non-alcoholic beverages in retail settings. Obes Rev. 2013;14(Suppl 1):70-81. doi:10.1111/obr.12077

231. Kondracki NL, Wellman NS, Amundson DR. Content analysis: review of methods and their applications in nutrition education. J Nutr Educ Behav. 2002;34(4):224-30. doi:10.1016/S1499-4046(06)60097-3

232. Australia New Zealand Food Standards Code - Schedule 4 - Nutrition, health and related claims. Canberra, Australia: Federal Register of Legislation, Australian Government; March 2016.

233. Feng GC. Underlying determinants driving agreement among coders. Qual Quant. 2013;47(5):2983-97. doi:10.1007/s11135-012-9807-z

234. Hansen A. Discourses of nature in advertising. Communications. 2002;27(4):499-511. doi:10.1515/comm.2002.005

235. Opel A. Constructing purity: bottled water and the commodification of nature. J Am Cult. 1999;22(4):67-76. doi:10.1111/j.1542-734X.1999.2204_67.x

236. Short D. When science met the consumer: the role of industry. Am J Clin Nutr. 2005;82(1 Suppl):256s-8s. doi:10.1093/ajcn/82.1.256S

237. Scrinis G. Reformulation, fortification and functionalization: Big Food corporations' nutritional engineering and marketing strategies. J Peasant Stud. 2016;43(1):17-37. doi:10.1080/03066150.2015.1101455

238. Eden S. Food labels as boundary objects. Public Underst Sci. 2009;20(2):179-94. doi:10.1177/0963662509336714

239. Siro I, Kapolna E, Kapolna B, Lugasi A. Functional food. Product development, marketing and consumer acceptance--a review. Appetite. 2008;51(3):456-67. doi:10.1016/j.appet.2008.05.060

240. Luomala H, Jokitalo M, Karhu H, Hietaranta-Luoma H-L, Hopia A, Hietamäki S. Perceived health and taste ambivalence in food consumption. JCM. 2015;32(4):290-301. doi:10.1108/JCM-11-2014-1233

241. Scrinis G. Nutritionism. The science and politics of dietary advice. New York: Columbia University Press; 2013.

242. Food Standards Australia and New Zealand. Nutrition, health and related claims. Canberra: FSANZ; May 2016 [cited 2016 Jul 7]. Available from: http://www.foodstandards.gov.au/industry/labelling/Pages/Nutrition-health-and-related-claims.aspx

243. Australian Natural Care. Cherry More Cherry Juice 1 Litre. 2019 [cited 2019 Nov 4]. Available from: https://www.ausnaturalcare.com.au/cherry-more-cherry-juice-1-litre?gclid=EAIaIQobChMIsenpzqqb5gIVyDUrCh0dIgE1EAYYASABEgIMk_D_BwE&gclsrc=aw.ds

244. Cherrymore. Cherrymore Cherry Juice [cited 2020 Apr 14]. Available from: http://cherrymore.com.au

245. Australia New Zealand Food Standards Code - Schedule 4 - Nutrition, health and related claims. Canberra, Australia: Federal Register of Legislation, Australian Government; September 2017.

246. Australia New Zealand Food Standards Code - Standard 1.8.2 - Nutrition information requirements. Canberra: Federal Register of Legislation, Australian Government; 2016 Mar.

247. Nudie. Veggie Nudie Juice [cited 2020 Apr 14]. Available from: http://www.nudie.com.au

248. Impressed. Summer Greens Juice [cited 2020 Apr 14]. Available from: https://www.impressedlife.com.au

249. Brownbill AL. Public consultation: labelling of sugars on packaged foods & drinks. Submitted 2018 Sep 19. Information available at: www.health.gov.au/internet/main/publishing.nsf/Content/mc17-019936-labelling-of-added-sugar

250. Food Regulation Standing Committee. Policy paper: labelling of sugars on packaged foods and drinks. 2019 June [cited 2019 Jul 14]. Available from: https://foodregulation.gov.au/internet/fr/publishing.nsf/Content/C6995F10A56B5D56CA2581EE00177CA8

251. Health Star Rating Advisory Committee. Two year progress review report on the implementation of the Health Star Rating system–June 2014–June 2016. 2017 [cited 2017 Jul 21]. Available from: http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/reviews

252. Commonwealth of Australia. Health Star Rating system. Canberra; 2014 [cited 2017 Jun 15]. Available from: http://healthstarrating.gov.au

253. Australian Government Department of Health. Health Star Rating system style guide. Canberra: 10 Jun 2016 (Version 4).

254. Health Star Rating Advisory Committee. Discussion paper - Five year review of the Health Star Rating System. 2017 Jun [cited 2017 Jul 17]. Available from: http://www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/formal-review-of-the-system-after-five-years

255. Pettigrew S, Talati Z, Miller C, Dixon H, Kelly B, Ball K. The types and aspects of front-of-pack food labelling schemes preferred by adults and children. Appetite. 2017;109:115-23. doi:10.1016/j.appet.2016.11.034

256. Talati Z, Pettigrew S, Kelly B, Ball K, Dixon H, Shilton T. Consumers' responses to front-of-pack labels that vary by interpretive content. Appetite. 2016;101:205-13. doi:10.1016/j.appet.2016.03.009

257. Talati Z, Norman R, Pettigrew S, Neal B, Kelly B, Dixon H, Ball K, Miller C, Shilton T. The impact of interpretive and reductive front-of-pack labels on food choice and willingness to pay. Int J Behav Nutr Phys Act. 2017;14(1):171. doi:10.1186/s12966-017-0628-2

258. Lawrence M, Dickie S, Woods J. Do nutrient-based front-of-pack labelling schemes support or undermine food-based dietary guideline recommendations? Lessons from the Australian Health Star Rating system. Nutrients. 2018;10(1):32. doi:10.3390/nu10010032

259. Peters S, Dunford E, Jones A, Ni Mhurchu C, Crino M, Taylor F, Woodward M, Neal B. Incorporating added sugar improves the performance of the Health Star Rating front-of-pack labelling system in Australia. Nutrients. 2017;9(7):701. doi:10.3390/nu9070701

260. Commonwealth of Australia. Guide for industry to the Health Star Rating calculator (HSRC). Version 5

261. Wellard L, Hughes C, Watson WL. Investigating nutrient profiling and Health Star Ratings on core dairy products in Australia. Public Health Nutr. 2016;19(15):2860-5. doi:10.1017/s1368980016000975

262. UK Department of Health. Guide to creating a front of pack (FoP) nutrition label for pre-packaged products sold through retail outlets. 2016 Nov [cited 2018 Jun 2]. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/566251/FoP_Nutrition_labelling_UK_guidance.pdf

263. Sacks G, Tikellis K, Millar L, Swinburn B. Impact of 'traffic-light' nutrition information on online food purchases in Australia. Aust N Z J Public Health. 2011;35(2):122-6. doi:10.1111/j.1753-6405.2011.00684.x

264. National Health and Medical Research Council. Australian Dietary Guidelines. Australian Government Department of Health and Ageing: Canberra; 2013.

265. Brownbill AL, Miller CL. Public submission to the Health Star Rating System 5 Year Review Draft Report. Submitted 2019 Mar 25. Information availble at: http://healthstarrating.gov.au

266. Brownbill AL. Public submission to the five year review of the Health Star Rating system - consultation on options for system enahcement. Submitted 2018 Dec 7. Information available at: http://healthstarrating.gov.au

267. Brownbill AL. Public submission to the five year review of the Health Star Rating system. Submitted 2017 Aug 4. Information available at: http://healthstarrating.gov.au

268. mpconsulting. Health Star Rating system five year review report

269. mpconsulting. Draft Health Star Rating system five year review report

270. mpconsulting. Five year review of the Health Star Rating system - consultation paper: options for system enhancement

271. Food Regulation Standing Committee. The Australia and New Zealand Ministerial Forum on Food Regulation response to the Health Star Rating system five year review. 2019 December [cited 2019 Jan 10]. Available from: http://www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/formal-review-of-the-system-after-five-years

272. Brownbill AL, Miller CL, Smithers LG, Braunack-Mayer AJ. Selling Function: The advertising of sugar-containing beverages on Australian television. Health Promot Int. 2020. daaa052. doi:10.1093/heapro/daaa052

273. World Obesity. World obesity resources. 2018 [cited 2019 Sep 17]. Available from: https://www.worldobesity.org/resources

274. Euromonitor International. Soft drinks in Australia. Sydney: Euromonitor International, 2019.

275. De Boer A, Bast A. International legislation on nutrition and health claims. Food Policy. 2015;55:61-70. doi:10.1016/j.foodpol.2015.06.002

276. Euromonitor International. Health and wellness in Australia. Sydney: Euromonitor International, 2019.

277. Brownbill AL, Braunack-Mayer AJ, Miller CL. What makes a beverage healthy? A qualitative study of young adults' conceptualisation of sugar-containing beverage healthfulness. Appetite. 2020;150:104675. doi:10.1016/j.appet.2020.104675

278. Potter J, Wetherell M. Discourse and social psychology: beyond attitudes and behaviour. London: Sage Publications; 1987.

279. Ussher JM, Perz J. Critical discourse/discourse analysis. In: Liamputtong P, editor. Handbook of research methods in health social sciences. Singapore: Springer; 2019. p. 881-96.

280. Machin D, Mayr A. How to do critical discourse analysis. A multimodal introduction. Los Angeles: Sage Publications; 2012.

281. Lupton D. Discourse analysis: a new methodology for understanding the ideologies of health and illness. Aust J Public Health. 1992;16(2):145-50. doi:10.1111/j.1753-6405.1992.tb00043.x

282. Smithers LG, Haag DG, Agnew B, Lynch J, Sorell M. Food advertising on Australian television: frequency, duration and monthly pattern of advertising from a commercial network (four channels) for the entire 2016. J Paediatr Child Health. 2018;54(9):962-7. doi:10.1111/jpc.13929

283. QSR International Pty Ltd. NVivo qualitative data analysis Software. Version 11. 2016.

284. Greenhalgh T, Wessely S. 'Health for me': a sociocultural analysis of healthism in the middle classes. Br Med Bull. 2004;69:197-213. doi:10.1093/bmb/ldh013

285. Crawford R. Health as a meaningful social practice. Health. 2006;10(4):401-20. doi:10.1177/1363459306067310

286. Scrinis G. On the ideology of nutritionism. Gastronomica. 2008;8(1):39-48. doi:10.1525/gfc.2008.8.1.39

287. Sointu E. The rise of an ideal: tracing changing discourses of wellbeing. Sociol Rev. 2005;53(2):255-74. doi:10.1111/j.1467-954x.2005.00513.x

288. Clarke A, Mamo L, Fishman J, Shim J, Fosket JB. A theoretical and substantative introduction. In: Riska E, editor. Biomedicalization: Technoscience, Health, and Illness in the US. Durham: Duke University Press; 2010. p. 1-44.

289. Block LG, Grier SA, Childers TL, Davis B, Ebert JJ, Kumanyika S, Laczniak RN, Machin JE, Motley CM, Peracchio L, Pettigrew S, Scott M, van Ginkel Bieshaar MG. From nutrients to nurturance: a conceptual introduction to food well-being. J Public Policy Mark. 2011;30(1):5-13. doi:10.1509/jppm.30.1.5

290. Bisogni CA, Jastran M, Seligson M, Thompson A. How people interpret healthy eating: contributions of qualitative research. J Nutr Educ Behav. 2012;44(4):282-301. doi:10.1016/j.jneb.2011.11.009

291. Aguilera JM, Kim B-K, Park DJ. Particular alimentations for nutrition, health and pleasure. Adv Food Nutr Res. 2019;87:371-408. doi:10.1016/bs.afnr.2018.07.005

292. Euromonitor International. Soft drinks global industry overview. London: Euromonitor International, 2019.

293. Taillie LS, Reyes M, Colchero MA, Popkin B, Corvalán C. An evaluation of Chile's Law of Food Labeling and Advertising on sugar-sweetened beverage purchases from 2015 to 2017: a before-and-after study. PLoS Med. 2020;17(2):e1003015. doi:10.1371/journal.pmed.1003015

294. Bergallo P, Castagnari V, Fernandez A, Mejia R. Regulatory initiatives to reduce sugar-sweetened beverages (SSBs) in Latin America. PLoS One. 2018;13(10):e0205694. doi:10.1371/journal.pone.0205694

295. Taillie LS, Busey E, Stoltze FM, Dillman Carpentier FR. Governmental policies to reduce unhealthy food marketing to children. Nutr Rev. 2019;77(11):787-816. doi:10.1093/nutrit/nuz021

296. Corvalán C, Reyes M, Garmendia ML, Uauy R. Structural responses to the obesity and non-communicable diseases epidemic: update on the Chilean law of food labelling and advertising. Obes Rev. 2019;20(3):367-74. doi:10.1111/obr.12802

297. Eisenberg ME, Larson NI, Gollust SE, Neumark-Sztainer D. What are we drinking? Beverages shown in adolescents' favorite television shows. J Acad Nutr Diet. 2017;117(5):763-9. doi:10.1016/j.jand.2016.12.004

298. Holmberg C, E. Chaplin J, Hillman T, Berg C. Adolescents' presentation of food in social media: an explorative study. Appetite. 2016;99:121-9. doi:10.1016/j.appet.2016.01.009

299. Holmberg C, Berg C, Dahlgren J, Lissner L, Chaplin JE. Health literacy in a complex digital media landscape: Pediatric obesity patients' experiences with online weight, food, and health information. Health Inform J. 2018;25(4):1343-57. doi:10.1177/1460458218759699

300. Freeman B, Kelly B, Vandevijvere S, Baur L. Young adults: beloved by food and drink marketers and forgotten by public health? Health Promot Int. 2015;31(4):954-61. doi:10.1093/heapro/dav081

301. Liamputtong P. Methodological frameworks and sampling. In: P. Liamputtong, editor. Qualitative research methods. 4th ed. Melbourne: Oxford University Press; 2013. p. 5-22.

302. Horowitz JA, Vessey JA, Carlson KL, Bradley JF, Montoya C, McCullough B. Conducting school-based focus groups: lessons learned from the CATS project. J Pediatr Nurs. 2003;18(5):321-31. doi:10.1016/s0882-5963(03)00104-0

303. Bere E, Glomnes ES, te Velde SJ, Klepp KI. Determinants of adolescents' soft drink consumption. Public Health Nutr. 2008;11(1):49-56. doi:10.1017/S1368980007000122

304. Jahn S, Schuch-Haellmigk J, Dannewald T, Boztuğ Y. How category average reference points affect choice of sugary foods. Appetite. 2018;126:201-9. doi:10.1016/j.appet.2018.04.001

305. Román S, Sánchez-Siles LM, Siegrist M. The importance of food naturalness for consumers: results of a systematic review. Trends Food Sci Technol. 2017;67(Supplement C):44-57. doi:10.1016/j.tifs.2017.06.010

306. Mariotti F, Kalonji E, Huneau JF, Margaritis I. Potential pitfalls of health claims from a public health nutrition perspective. Nutr Rev. 2010;68(10):624-38. doi:10.1111/j.1753-4887.2010.00322.x

307. Hilton J. Growth patterns and emerging opportunities in nutraceutical and functional food categories: market overview. In: Bagchi D, Nair S, editors. Developing new functional food and nutraceutical products: Academic Press; 2017. p. 1-28.

308. Vukasović T. Functional foods in line with young consumers: challenges in the marketplace in Slovenia. In: Bagchi D, Nair S, editors. Developing new functional food and nutraceutical products: Academic Press; 2017. p. 391-405.

309. Beverage Industry. Holistic nutrition proves to be tailored across age groups. 2019 Aug 27 [cited 2019 Oct 10]. Available from: www.bevindustry.com/articles/92356-holistic-nutrition-proves-to-be-tailored-across-age-groups?id=92356-holistic-nutrition-proves-to-be-tailored-across-age-groups&oly_enc_id=5346E1974723I7Z

310. De Vlieger NM, Collins C, Bucher T. What is a nutritious snack? Level of processing and macronutrient content influences young adults' perceptions. Appetite. 2017;114:55-63. doi:10.1016/j.appet.2017.03.021

311. Tierney M, Gallagher A, Giotis E, Pentieva K. An online survey on consumer knowledge and understanding of added sugars. Nutrients. 2017;9(1):37. doi:10.3390/nu9010037

312. Bragg MA, Roberto CA, Harris JL, Brownell KD, Elbel B. Marketing food and beverages to youth through sports. J Adolesc Health. 2018;62(1):5-13. doi:10.1016/j.jadohealth.2017.06.016

313. Vassallo JA, Kelly B, Zhang L, Wang Z, Young S, Freeman B. Junk food marketing on Instagram: content analysis. JMIR Public Health Surveill. 2018;4(2):e54. doi:10.2196/publichealth.9594

314. Buchanan L, Yeatman H, Kelly B, Kariippanon K. A thematic content analysis of how marketers promote energy drinks on digital platforms to young Australians. Aust N Z J Public Health. 2018;42(6):530-1. doi:10.1111/1753-6405.12840

315. Dunlop S, Freeman B, Jones SC. Marketing to youth in the digital age: the promotion of unhealthy products and health promoting behaviours on social media. Media and Communication. 2016;4(3):35-49. doi:10.17645/mac.v4i3.522

316. Buchanan L, Yeatman H, Kelly B, Kariippanon K. Digital promotion of energy drinks to young adults is more strongly linked to consumption than other media. J Nutr Educ Behav. 2018;50(9):888-95. doi:10.1016/j.jneb.2018.05.022

317. Hess JM, Lilo EA, Cruz TH, Davis SM. Perceptions of water and sugar-sweetened beverage consumption habits among teens, parents and teachers in the rural south-western USA. Public Health Nutr. 2019;22(8):1376-87. doi:10.1017/s1368980019000272

318. Roberts KE, Ells LJ, McGowan VJ, Machaira T, Targett VC, Allen RE, Tedstone AE. A rapid review examining purchasing changes resulting from fiscal measures targeted at high sugar foods and sugar-sweetened drinks. Nutr Diabetes. 2017;7(12):302. doi:10.1038/s41387-017-0001-1

319. Redondo M, Hernandez-Aguado I, Lumbreras B. The impact of the tax on sweetened beverages: a systematic review. Am J Clin Nutr. 2018;108(3):548-63. doi:10.1093/ajcn/nqy135

320. Bogart LM, Elliott MN, Ober AJ, Klein DJ, Hawes-Dawson J, Cowgill BO, Uyeda K, Schuster MA. Home sweet home: parent and home environmental factors in adolescent consumption of sugar-sweetened beverages. Acad Pediatr. 2017;17(5):529-36. doi:10.1016/j.acap.2017.01.015

321. Denney-Wilson E, Crawford D, Dobbins T, Hardy L, Okely AD. Influences on consumption of soft drinks and fast foods in adolescents. Asia Pac J Clin Nutr. 2009;18(3):447-52.

322. Haughton CF, Waring ME, Wang ML, Rosal MC, Pbert L, Lemon SC. Home matters: adolescents drink more sugar-sweetened beverages when available at home. J Pediatr. 2018;202:121–8. doi:10.1016/j.jpeds.2018.06.046

323. Watts AW, Miller J, Larson NI, Eisenberg ME, Story MT, Neumark-Sztainer D. Multicontextual correlates of adolescent sugar-sweetened beverage intake. Eat Behav. 2018;30:42-8. doi:10.1016/j.eatbeh.2018.04.003

324. Zahid A, Davey C, Reicks M. Beverage intake among children: associations with parent and home-related factors. Int J Environ Res Public Health. 2017;14(8):929. doi:10.3390/ijerph14080929

325. Johnston LD, Delva J, O'Malley PM. Soft drink availability, contracts, and revenues in American secondary schools. Am J Prev Med. 2007;33(4):209-25. doi:10.1016/j.amepre.2007.07.006

326. Piaggio LR. Sugar-sweetened beverages and sports sponsorship: the right to health of children and adolescents at stake. Arch Argent Pediatr. 2019;117(1):e8-e13. doi:10.5546/aap.2019.eng.e8

327. Pomeranz JL, Munsell CR, Harris JL. Energy drinks: an emerging public health hazard for youth. J Public Health Pol. 2013;34(2):254-71. doi:10.1057/jphp.2013.6

328. Coyle DH, Ndanuko R, Singh S, Huang P, Wu JH. Variations in sugar content of flavored milks and yogurts: a cross-sectional study across 3 countries. Curr Dev Nutr. 2019;3(6):nzz060-nzz. doi:10.1093/cdn/nzz060

329. Keric D, Stafford J. Proliferation of 'healthy' alcohol products in Australia: implications for policy. Public Health Res Pract. doi:10.17061/phrp28231808

330. Christian N. Mindful drinking: health trends spilling into alcohol industry as brands pour lighter offerings. The Daily Telegraph [Internet]. 2019 Apr 22 [cited 2019 May 28]. Available from: https://www.dailytelegraph.com.au/lifestyle/food/mindful-drinking-health-trends-spilling-into-alcohol-industry-as-brands-pour-lighter-offerings/news-story/81e57aa5353bb41f9444663c513ec157.

331. Babor T. Alcohol no ordinary commodity: Research and public policy. 2nd ed. Oxford: Oxford University Press; 2010.

332. Obesity Evidence Hub. Australia's system of regulation. Melbourne: Cancer Council Victoria; 2019 [cited 2019 Oct 24]. Available from: https://www.obesityevidencehub.org.au/collections/prevention/australias-system-of-regulation

333. Hickey K, Mandelbaum J, Bloom K, Martin J. Overbranded, underprotected: How industry self-regulation is failing to protect children from unhealthy food marketing Melbourne: Obesity Policy Coalition; 2018 [cited 2019 Aug 21]. Available from: https://www.opc.org.au/what-we-do/overbranded-underprotected

334. Australian Competition and Consumer Commission. False or misleading claims [cited 2019 Oct 24]. Available from: https://www.accc.gov.au/consumers/misleading-claims-advertising/false-or-misleading-claims#creating-a-false-or-misleading-impression

335. Rutkow L, Vernick JS, Edwards DM, Rodman SO, Barry CL. Legal action against health claims on foods and beverages marketed to youth. Am J Public Health. 2015;105(3):450-6. doi:10.2105/AJPH.2014.302376

336. Obesity Evidence Hub. Nutrition content claims and health claims on packs. Melbourne: Cancer Council Victoria; 2019 [cited 2020 Feb 5]. Available from: https://obesityevidencehub.org.au/collections/prevention/nutrition-content-claims

337. Australian Competition and Consumer Commission. Court finds Heinz made a misleading health claim 2018 [cited 2020 Feb 2]. Available from: https://www.accc.gov.au/media-release/court-finds-heinz-made-a-misleading-health-claim

338. 'Red Bull does not give you wings': Company settles $US13mil lawsuit over false advertising claims. SBS News [Internet]. 2014 Oct 8 [cited 2020 Feb 5]. Available from: https://www.sbs.com.au/news/red-bull-does-not-give-you-wings-company-settles-us13mil-lawsuit-over-false-advertising-claims.

339. Gilmore E. Class action alleges honest tea's 'just a tad sweet' claim is misleading: ClassAction.org; 2020 Jan 23 [cited 2020 Feb 5]. Available from: https://www.classaction.org/news/class-action-alleges-honest-teas-just-a-tad-sweet-claim-is-misleading

340. Collier R. Litigious future for Big Sugar? CMAJ News [Internet]. 2017 Feb 14 [cited 2020 Feb 5]. Available from: https://cmajnews.com/2017/02/14/litigious-future-for-big-sugar-109-5388.

341. Australian Government. Children's Television Standards 2009 Canberra: Federal Register of Legislation; 2009 [cited 2019 Oct 24]. Available from: https://www.legislation.gov.au/Details/F2014C01386

342. Australian Food and Grocery Council. Responsible Children's Marketing Initiative 2018 [cited 2019 Oct 24]. Available from: https://www.afgc.org.au/industry-resources/rcmi-and-qsri

343. Australian Food and Grocery Council. Quick Service Restaurant Industry Initiative for Responsible Advertising and Marketing to Children 2018 [cited 2019 Oct 24]. Available from: https://www.afgc.org.au/industry-resources/rcmi-and-qsri

344. Australian Association of National Advertisers. Code for Marketing and Advertising Communications to Children. Sydney: Australian Association of National Advertisers; 2017 [cited 2019 Oct 24]. Available from: http://aana.com.au/self-regulation/codes

345. Ronit K, Jensen JD. Obesity and industry self-regulation of food and beverage marketing: a literature review. Eur J Clin Nutr. 2014;68(7):753-9. doi:10.1038/ejcn.2014.60

346. Potvin Kent M, Smith JR, Pauze E, L'Abbe M. The effectiveness of the food and beverage industry's self-established uniform nutrition criteria at improving the healthfulness of food advertising viewed by Canadian children on television. Int J Behav Nutr Phys Act. 2018;15(1):57. doi:10.1186/s12966-018-0694-0

347. Smithers LG, Lynch JW, Merlin T. Industry self-regulation and TV advertising of foods to Australian children. J Paediatr Child Health. 2014;50(5):386-92. doi:10.1111/jpc.12488

348. Hawkes C, Harris JL. An analysis of the content of food industry pledges on marketing to children. Public Health Nutr. 2011;14(8):1403-14. doi:10.1017/s1368980011000607

349. Robles B, Blitstein JL, Lieberman AJ, Barragan NC, Gase LN, Kuo T. The relationship between amount of soda consumed and intention to reduce soda consumption among adults exposed to the Choose Health LA 'Sugar Pack' health marketing campaign. Public Health Nutr. 2015;18(14):2582-91. doi:10.1017/s1368980014003097

350. Boles M, Adams A, Gredler A, Manhas S. Ability of a mass media campaign to influence knowledge, attitudes, and behaviors about sugary drinks and obesity. Prev Med. 2014;67 Suppl 1:S40-5. doi:10.1016/j.ypmed.2014.07.023

351. Bleakley A, Jordan A, Mallya G, Hennessy M, Piotrowski JT. Do you know what your kids are drinking? evaluation of a media campaign to reduce consumption of sugar-sweetened beverages. Am J Health Promot. 2018;32(6):1409-16. doi:10.1177/0890117117721320

352. Farley TA, Halper HS, Carlin AM, Emmerson KM, Foster KN, Fertig AR. Mass media campaign to reduce consumption of sugar-sweetened beverages in a rural area of the United States. Am J Public Health. 2017;107(6):989-95. doi:10.2105/ajph.2017.303750

353. Morley BC, Niven PH, Dixon HG, Swanson MG, McAleese AB, Wakefield MA. Controlled cohort evaluation of the LiveLighter mass media campaign's impact on adults' reported consumption of sugar-sweetened beverages. BMJ open. 2018;8(4):e019574. doi:10.1136/bmjopen-2017-019574

354. Taillie LS, Hall MG, Popkin BM, Ng SW, Murukutla N. Experimental studies of front-of-package nutrient warning labels on sugar-sweetened beverages and ultra-processed foods: a scoping review. Nutrients. 2020;12(2):569. doi:10.3390/nu12020569

355. Billich N, Blake MR, Backholer K, Cobcroft M, Li V, Peeters A. The effect of sugar-sweetened beverage front-of-pack labels on drink selection, health knowledge and awareness: An online randomised controlled trial. Appetite. 2018;128:233-41. doi:10.1016/j.appet.2018.05.149

356. VanEpps EM, Roberto CA. The influence of sugar-sweetened beverage warnings. Am J Prev Med. 2016;51(5):664-72. doi:10.1016/j.amepre.2016.07.010

357. Roberto CA, Wong D, Musicus A, Hammond D. The influence of sugar-sweetened beverage health warning labels on parents' choices. Pediatrics. 2016;137(2):131. doi:10.1542/peds.2015-3185

358. Bollard T, Maubach N, Walker N, Ni Mhurchu C. Effects of plain packaging, warning labels, and taxes on young people's predicted sugar-sweetened beverage preferences: an experimental study. 2016;13(1):95. doi:10.1186/s12966-016-0421-7

359. Mantzari E, Pechey R, Codling S, Sexton O, Hollands GJ, Marteau TM. The impact of 'on-pack' pictorial health warning labels and calorie information labels on drink choice: a laboratory experiment. Appetite. 2020;145:104484. doi:10.1016/j.appet.2019.104484

360. Scully M, Morley B, Wakefield M, Dixon H. Can point-of-sale nutrition information and health warnings encourage reduced preference for sugary drinks?: an experimental study. Appetite. 2020;149:104612. doi:10.1016/j.appet.2020.104612

361. Palmedo C.P, Dorfman L, Garza S, Murphy E, Freudenberg N. Countermarketing alcohol and unhealthy food: an effective strategy for preventing noncommunicable diseases? Lessons from tobacco. Annu Rev Public Health. 2017;38:119-44. doi:10.1146/annurev-publhealth-031816-044303